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ADULT DEVELOPMENT AND AGING

SECOND CANADIAN EDITION

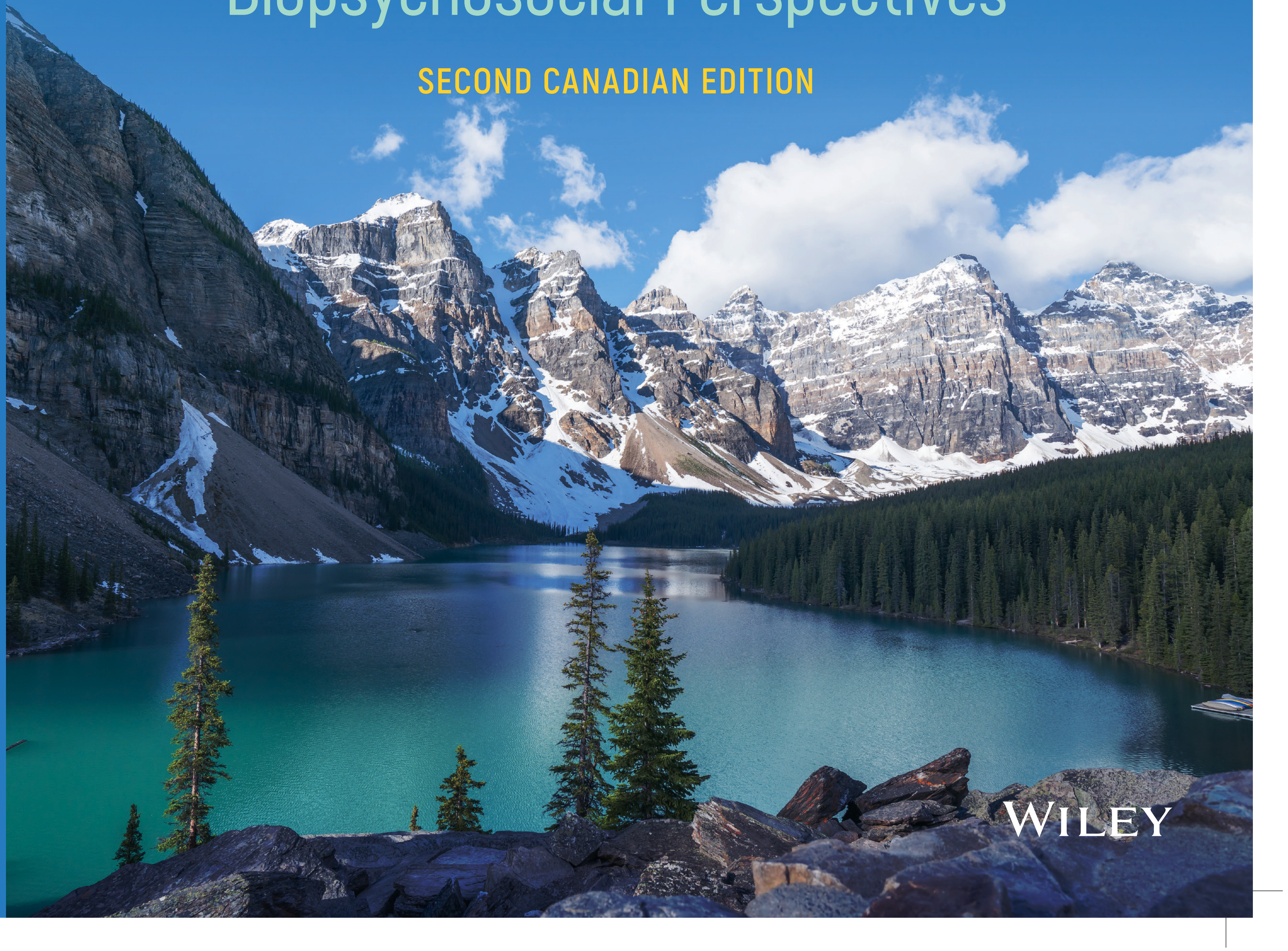
WILEY

SUSAN K. WHITBOURNE | STACEY B. WHITBOURNE
CANDACE KONNERT

ADULT DEVELOPMENT AND AGING

Biopsychosocial Perspectives

SECOND CANADIAN EDITION



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ADULT DEVELOPMENT & AGING

BIOPSYCHOSOCIAL PERSPECTIVES

Second Canadian Edition

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BIOPSYCHOSOCIAL PERSPECTIVES

Second Canadian Edition

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PREFACE

Everyone ages. This very fact should be enough to draw you into the subject matter of this course, whether you are the student or the instructor. Yet, for many people, it is difficult to imagine the future 50, 40, or even 10 years from now. The goal of our book is to help you imagine your future and the future of your family, your friends, and your society. We have brought together the latest scientific findings about aging with a more personal approach to encourage you to take this imaginative journey into your future.

The Second Canadian edition of *Adult Development and Aging: Biopsychosocial Perspectives* incorporates material that we believe is vital to your understanding of this rapidly developing and fascinating field of study.

It is our hope and belief that you will find yourself as engrossed in the psychology of adult development and aging as we are. Not only is everyone around you aging, but also the issues that researchers in the field examine range all the way from the philosophical to the practical. Why do living things age? Is there a way to slow down the aging process? How will society deal with the aging of the baby boomers? How will job markets be affected by an aging society? Will the young adults of today age differently than did their parents and grandparents? Bringing it to a personal level, as you take the course, you'll start to ask questions about your own life. What challenges await you as you begin your career? What will it be like to start a family? How will you manage the transition into your early adulthood as you leave school behind to pursue your own life? All of these, and more, are questions that you will find yourself asking as you explore the many complexities of the process that causes people to change and grow throughout life. You will learn not only how people grow older but also how to grow older in a way that is healthy and satisfying.

THEMES OF THE BOOK

The biopsychosocial model emphasized in this book is intended to encourage you to think about the multiple interactions among the domains of biology, psychology, and sociology. According to this model, changes in one area of life have effects on changes in other areas. The centrepiece of this model is identity, your self-definition. You interpret the experiences you have through the framework provided by your identity. In turn, your experiences stimulate you to change your self-definition.

This is an exciting time to be studying adult development and aging. The topic is gaining increasing media attention and tremendous momentum as an academic discipline within life-span development. The biopsychosocial model fits within the framework of contemporary approaches taking hold in the sciences in general that emphasize the impact of social context on individuals throughout all periods of life. Entirely new concepts, sets of data, and practical applications of these models are resulting in a realization of the dreams of many of the classic developmental psychologists whose work shaped the field in the early 20th century.

Adult development and aging are areas that have no national boundaries. Aging is now being recognized as a priority for researchers and policy makers around the world, not only in the United States and Canada. We can all benefit from this international perspective both for our own countries and for those of citizens around the world.

ORGANIZATION

If you read the chapters of this book in order from start to finish, you will progress from the basics in the first three chapters to more complex issues, starting in Chapter 4, that place relatively more emphasis on the "bio," the "psycho," and the "social." However, not all instructors choose to proceed in this fashion, and the book has been designed with this flexibility as an option. We emphasize the biopsychosocial model throughout, in that many of the topics, regardless of where they appear in the book, span areas as diverse, for example, as driving and diabetes.

We do recommend, though, that the last chapter you read is not the one on death and dying, as is often the case in other books in the field. The last chapter of the book covers successful aging. Many students and instructors have shared with us their appreciation of our ending on a "high note." Even though death is obviously the final period of life, we each have the potential to live on after our own ending through the works we create, the legacies we leave behind, and the people whose lives we have touched. These are the themes that we would like you to take with you from this book in the years and decades ahead.

FEATURES

Up-to-Date Research

The topics and features in this book are intended to involve you in the field of aging from a scholarly and personal perspective. You will find that the most current research is presented throughout the text, with careful and detailed explanations of the studies that highlight the most important scholarly advances. We have given particular attention to new topics and approaches, including neuroscience and genetics, as well as continuing to bring to students the latest advances in cognition, personality, relationships, and vocational development as well as highlighting sociocultural influences on development, including race, ethnicity, and social class.

AgeFeed

The chapters begin with our very own "AgeFeed" openers to give you an introduction to the topic. These are in the form of fact versus myth challenges, self-tests, or lists relevant to each chapter that take one of several formats. For AgeFeed openers that involve a challenge or self-test, the answers are provided for you so that you can score yourself. Your instructor may decide to assign these to tests, so be sure to read them over carefully. We hope you like them!

Engaging Figures and Tables

Most of the figures and photographs in this second edition were redesigned from the previous edition with updated information and formats. These will help you learn and remember the key information presented in the text. Our selection of these materials connects to the PowerPoint slides that instructors can download from the Wiley website.

Contemporary Approach

You will find many current examples relevant to people in your age group, whether you're a returning student or a student of traditional college age. Instructors, too, will find material that they can relate to their own experiences, whether they are relative newcomers or more seasoned academics.

STUDENT LEARNING AIDS

Glossary Terms

We have made a concerted effort in this edition to provide a large number of glossary terms, indicated in bold in each chapter, and listed at the end of the book. Although it may seem like you will have a great many terms to memorize, the fact of the matter is that you will need to learn them anyway, and by having them provided in your glossary, you'll find it easier to spot them when it comes time to review for your exams. The majority of these terms relate specifically to adult development and aging, but where we felt it was helpful for you to review a term that you may not have encountered for a while, we also included several terms of a more general nature.

Numbered Summaries

You will find a numbered summary for each chapter that will supplement your studying and help you narrow down your reviewing to the chapter's main points. Together with the glossary terms, these will give you a comprehensive overview of the chapter.

CHANGES TO THE SECOND CANADIAN EDITION

The Second Canadian edition of *Adult Development and Aging: Biopsychosocial Perspectives* was written to provide current information within the context of contemporary Canadian Society that is relevant to students. As in the previous edition, the focus is on three themes: a multidisciplinary approach, positive images of aging, and the newest and most relevant research. Related to the theme of positive aging is the idea that we all have considerable control over how we age, for example, by adopting healthy practices such as diet and exercise throughout our lives. In short, what you are doing now (or not doing) will influence how you age. We want you, our readers, to feel as connected to the material as possible. Our thinking is that students will be more motivated to complete their reading if they like the text and feel that they can relate to it. At the same time, instructors will find their job that much easier because students sitting in their classrooms will come to class ready to discuss what they have read.

Instructors who have developed their course based on the first edition will not need to change the basic structure of their lectures and assignments. However, to reflect this ever-changing field, we shifted material within the chapters, in some cases deleting topics that by now are no longer considered relevant in order to make room to cover the newer approaches that have come into prominence.

Our goal is to provide the latest findings while preserving information of relevance to the "classic" studies in the field. Thus, although many of the classics remain, we have included over 500 references from the past few years. Population data reflects the most recent surveys, for example, from Statistics Canada and the Canadian Institute for Health Information. We also give expanded coverage to global population and health data in keeping with our stated goal of providing an international perspective.

In addition to the Canadian content in the first edition, Chapter 11 in the second edition highlights new publications from the Canadian Coalition for Seniors' Mental Health in the areas of alcohol, benzodiazepine, cannabis, and opioid use disorders among older adults. Chapter 12 focuses on the increasingly complex care needs of older adults in long-term care and the fragmented and underfunded long-term care system, which became clearly evident to all Canadians during the COVID-19 pandemic. The message throughout this chapter is, we can and must do better in caring for our most vulnerable older adults. In addition to COVID-19, the most significant event in the Canadian context since the last edition was the legalization in 2016 of Medical Assistance in Dying, or MAiD. This is discussed in Chapter 13 as well as the subsequent recommendations from the Council of Canadian Academies that will inform future legislation for MAiD for mature minors, those with a mental illness, and those who have conditions that will limit their future decision-making capacity (e.g., major neurocognitive impairment). The chapter also highlights the need for improved access to palliative care and provides resources (e.g., Canadian Virtual Hospice, Speak Up Canada) for informing and assisting Canadians. Candace's experience teaching courses in aging and death and dying underscored the general lack of knowledge about MAiD and end-of-life issues. Moreover, these topics have generated enthusiastic and passionate classroom discussions as students grapple with their own opinions and values and the associated ethical issues and implications for Canadian society. The goal of the chapter is to provide contextual information that will form the basis for lively classroom exchanges. As in the first edition, diversity is an ongoing theme across chapters and includes, but is not limited to, ethnocultural diversity. The experience of aging among Indigenous elders is highlighted in the chapters where it is most relevant.

A major goal in writing the book was to provide students with practical resources that they can use and share with others. The text also contains information on Canadian gerontology organizations, gerontology and research centres, and unique Canadian developments such as the Canadian Longitudinal Study on Aging and age-friendly communities within Canada. In this book, students will learn about cherished traditions in adult development and aging but also learn where this exciting field is headed in the coming decades. It will provide them with the opportunity to reflect on their vision of how they will age and how aging will unfold in their families and in the Canadian and global context.

INSTRUCTOR RESOURCES

Instructor's Manual and Test Bank You will find lecture guidelines, suggested videos and films, discussion questions, and a test bank for each chapter. The test bank includes multiple-choice questions, short answers, and essay questions. Each multiple-choice question is labelled according to the concept it tests, along with its difficulty level (based on class testing). We include short answer and essay questions that correspond with each section of the chapter. Because they are in convenient Microsoft Word format, instructors can adapt them to their own particular needs. A computerized test bank is also available to instructors.

PowerPoint Slides Prepared for use in lectures, we provide you with a complete set of PowerPoint slides designed specifically for this book. Instructors can easily adapt them for their own specific needs.

ACKNOWLEDGEMENTS

First and foremost, thank you to Mark, Sam, and Heidi for the many wonderful family times we have shared. I am grateful to be aging well in a supportive couple and family context. As you continue along in your aging journey I hope I can be there for you as much as you have been there for me. Thank you to my sisters Barb Pesut and Bev Freathy for making life a whole lot more fun. Here's to many more kitchen dance parties! I am grateful to Bill and Ileen Konnert who continue to demonstrate tremendous resilience and good humour. You are an inspiration to me and to many others. Finally, I dedicate this book to my mother, Johanna McLeod, who grew older with style and grace.

Candace Konnert
July 2020

ABOUT THE AUTHORS

Candace Konnert, Ph.D., is a Professor of Psychology at the University of Calgary. She received her Ph.D. in clinical psychology (with a specialty in clinical aging) from the University of Southern California in 1987, and completed her predoctoral internship at the University of California, Los Angeles. She teaches undergraduate courses in aging and clinical psychology, and graduate courses in psychopathology, research methods, and clinical geropsychology. She is the Director of Training for the clinical psychology program at the University of Calgary. She is the recipient of the Canadian Council of Professional Psychology Programs Excellence in Training Award and a University of Calgary Students' Union Excellence in Teaching Award. Teaching undergraduate courses in aging has been deeply rewarding, in particular introducing students who are interested in developmental psychology to the second half of the life span. She is actively involved in the supervision of graduate students and is very proud to say that many of them are practising clinical geropsychologists, working to better the lives of older adults and their family members. Her research interests focus on planning for future aging and mental health and aging, particularly among those most vulnerable. She is also interested in mental health education and training for health and mental health providers. Most recently, her research has appeared in *Psychology and Aging; Journals of Gerontology; Clinical Gerontologist; Canadian Journal on Aging; and Aging and Mental Health*. She is an avid backpacker, skier, and fly fisher and loves to roam the rivers and streams in the Canadian Rockies, looking for that next big strike.

Susan Krauss Whitbourne, Ph.D., is a Professor Emerita of Psychological and Brain Sciences at the University of Massachusetts Amherst and Adjunct Professor and Faculty Fellow in Gerontology at the University of Massachusetts Boston. She received her Ph.D. in developmental psychology from Columbia University in 1974 and completed a postdoctoral training program in clinical psychology at the University of Massachusetts at Amherst, having joined the faculty there in 1984. Her teaching has been recognized with the College Outstanding Teacher Award in 1995 and the University Distinguished Teaching Award in 2001. Her work as an advisor was recognized with the Outstanding Academic Advisor Award in 2006. In 2003, she received the American Psychological Association (APA) Division 20 (Adult Development and Aging) Master Mentor Award and the Gerontological Society of America (GSA) Behavioral and Social Sciences Distinguished Mentorship Award. Over the past 20 years, Dr. Whitbourne has held a variety of elected and appointed positions in the American Psychological Association (APA) and in the Gerontological Society of America. In 2011, her many contributions were recognized with an APA Presidential Citation. Her publications include 19 published books, many in multiple editions, and more than 175 journal articles and chapters in prestigious journals and books. She has over 250 conference presentations, including several invited addresses. She has been a consulting editor for *Psychology and Aging*, serves on the editorial board of the *Journal of Gerontology,* and was a consulting editor for *Developmental Psychology*. She is editor-in-chief of the Wiley-Blackwell *Encyclopedia of Aging*. In addition to her professional writing, she writes a blog for *Psychology Today* called "Fulfillment at Any Age" and has consulted for publication of the National Geographic Society in psychology and serves on the Prevention.com health review board.

Stacey B. Whitbourne, Ph.D., received her Ph.D. in social and developmental psychology from Brandeis University in 2005 where she was funded by a National Institute on Aging training fellowship. She completed her postdoctoral fellowship at the Boston University School of Public Health, Department of Epidemiology, funded by a National Institute on Aging Grant and a Department of Veterans Affairs Rehabilitation Research and Development Service Grant. Currently she is a research health scientist at the Massachusetts Veterans Epidemiology and Research Information Center (MAVERIC), an independent research centre housed within the VA Boston Healthcare System. She serves as the Program Director of Recruitment and Enrollment for the Million Veteran Program, a longitudinal health and genomic cohort funded by the Department of Veterans Affairs Office of Research and Development. In addition, she is an instructor of medicine at Harvard Medical School and an associate epidemiologist at the Division of Aging at Brigham and Women's Hospital. She has taught courses on adult development and aging at Brandeis University and the University of Massachusetts Boston. The author of several published articles, she is also a coauthor on a chapter for the Sage Series on Aging in America and has given more than 30 presentations at national conferences. She has received numerous commendations and awards for her work with the Million Veteran Program from the Department of Veterans Affairs.

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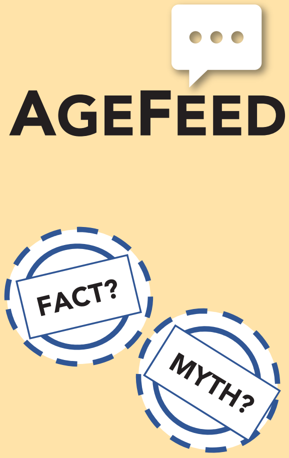
1

Themes and Issues in Adult Development and Aging

At the beginning of each chapter, we invite you to check out ''Age Feed'' to see top 10 lists, take quizzes, or learn fun facts about the chapter ahead.

To get started, as you will learn in Chapter* 1*, there are many myths about aging. See if you're able to separate fact from fiction in these statements and check your answers on the next page.


AGEFEED
FACT?
MYTH?

1. All older adults are alike.
2. Most older adults live in nursing homes.
3. Loss of interest in sex and intimacy is a normal part of aging.
4. Most older adults stay socially active.
5. Alzheimer's disease is an inevitable part of aging.
6. Older adults are unable to learn new skills.
7. Memory loss is normal as people grow older.
8. People become more pessimistic in later life.
9. Creativity peaks early in adulthood and declines after that.
10. As people get older, they need more assistance in daily life.

AGEFEED ...the facts

1. All older adults are alike.
   Myth! The range of ages among older adults spans five decades; they differ more than any other age group.
2. Most older adults live in nursing homes.
   Myth! Only about 5 percent of older adults in Canada are in nursing homes although this rises to 35 percent for those 85 to 89 and 53 percent for centenarians.
3. Loss of interest in sex and intimacy is a normal part of aging.
   Myth! Although the frequency of sexual activity may decrease, most older adults continue to enjoy a fulfilling sex life.
4. Most older adults stay socially active.
   Fact! Many older adults continue working, volunteer, and are part of a family social network.
5. Alzheimer's disease is an inevitable part of aging.
   Myth! Alzheimer's disease and other forms of cognitive loss occur in a minority of older adults.
6. Older adults are unable to learn new skills.
   Myth! Learning new skills may take longer, but the ability to learn continues throughout later life.
7. Memory loss is normal as people grow older.
   Fact and myth! Short-term memory may be less efficient, but long-term memory is maintained in later life.
8. People become more pessimistic in later life.
   Myth! Older adults are more likely to feel satisfied with their lives and to be optimistic about getting older.
9. Creativity peaks early in adulthood and declines after that.
   Myth! There are many examples of famous creative older adults but even ordinary individuals can be creative throughout their lives.
10. As people get older, they need more assistance in daily life.
    Fact! The need for assistance increases in later adulthood, but only reaches as high as 53 percent for women aged 85 and older.

Aging affects everyone. If you want to know your true age, don't look at the calendar. The calendar tells you what your chronological age is, but this number may be far from accurate in defining who you are. All you know from your chronological age is how many times you've sat on the earth while the earth orbits around the sun. As an index of aging, chronological age is deeply flawed.

Perhaps the biggest reason is that industrialized societies such as our own measure productivity in terms of time. Agrarian societies kept track of time by referring to markers in the seasonal variations of the sun, moon, and planets. As society became industrialized, people increasingly relied on clocks to set the pace of work. Age then became part of that industrialized system. Atomic clocks that measure the tiniest fraction of a second give us no respite from time's arrow.

Just as age and time become woven into our society's fabric, so too is the way that society defines each of us in terms of this magic number. Did you ever notice that the first piece of information in a news article or even a wedding announcement, right after the name, is the age? If you'd rather your neighbours didn't know your exact age, you'd better be sure not to get involved in a jaywalking accident or fender-bender. Your age will follow your name, and there's no way around that. With age being such a crucial feature of a person's identity that we tag everyone from newlyweds to traffic scofflaws with it, it's no wonder that you feel you'd float off into a cloud if you couldn't hang onto this defining feature of your very being.

Yet age is not a very good indication of very much about a person. Think of the older-than-her-years hypermature 15-year-old who could easily pass for 22. How about the older adult who lives down the street from you whose sprightly step would rival that of someone 40 years her junior? As Margaret Atwood once said about the subjective nature of age, "Another belief of mine: that everyone else my age is an adult, whereas I am merely in disguise."

Perhaps the best way to test your functional age is to ask yourself this very simple question: how old do you feel? Forget what the calendar says, and even forget what your functional ages are. The age you feel may very well be the most important factor determining your health, happiness, and longevity. Research consistently demonstrates that the people who are happiest and best adjusted in their middle and later years are the ones who don't focus on their limitations, worry about their memory, or become preoccupied with whether others view them as old. Being able to subtract a few years from this subjective age, or age that you feel, may actually buy you a few more objective years of a healthy and productive life.

Aging affects everyone. From the moment you are born, your aging process begins. If you are of traditional university age, you are undergoing a time of transition from adolescence to adulthood. The concept of being an adult may be new to you and the idea of being an older adult may seem far off. Our purpose in writing this book is to help you think about your own aging as well as the aging process more generally. You may have decided to take this course to help understand your aging family members or trends in society, but we hope that before long you think about what will happen to you as you yourself get older.

Let's start by asking you what comes to mind when you think of your current age. Is it an important part of who you are, or do you not think about your actual age? Next, ask yourself whether you consider yourself to be an "adult." What does the word *adult* mean to you? Is it a term you would use to describe others who are older than you are now? Finally, what are your thoughts about the aging process? When you think of older adults, do you immediately regard them as unable to care for themselves? What is the "typical" older adult like, in your eyes?

Just by thinking about these questions, you've already started to focus on what age means in terms of your overall sense of self. These are the types of questions that we'll explore throughout the book. Even as we go in depth into the effects of the aging process throughout adulthood, we will often come back and question how much we really know about a person based on age alone. We'll also show you that some age distinctions are almost arbitrary. Someone decided that a certain age means you're in a certain stage of life and from that point forward, people attribute a great deal of meaning to that particular number. In reality, however, the aging process isn't completely linked to the passage of time alone.

Our goal is to encourage you to undertake personal explorations as you gain factual information about the aging process. Not only will the material help you in your career (regardless of what field you go into), but it will also help you understand yourself and how you change over time. You'll also learn, perhaps surprisingly, that you don't have to sit back and let the aging process passively affect you. There are active steps you can take to make sure that you keep functioning as well as possible for as long as possible throughout your entire life. With a few simple precautions, you can avoid the illnesses that limit people's ability to enjoy themselves into their later decades.

If you're a traditional university-age student embarking on your 20s, we hope to help you appreciate that it is never too early to start incorporating these changes into your lifestyle. And for our readers of non-traditional university age, we hope to help you see that it is never too late to initiate behaviours that can maintain, if not enhance, your everyday functioning. A key goal of this book is to involve you in the progression of your aging process and show you ways to be an active part of your own development.

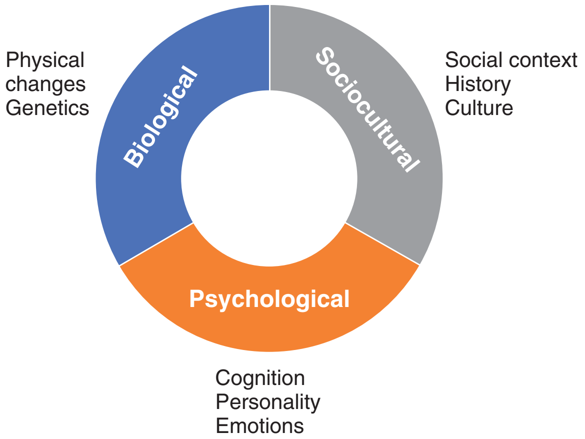
THE BIOPSYCHOSOCIAL PERSPECTIVE

We have organized the book around the **biopsychosocial perspective**, a view of development as a complex interaction of biological, psychological, and social processes. Aging is not a simple, straightforward progression through time. Your body undergoes biological changes largely influenced by your genetics or physiology. At the same time, you change psychologically in ways that reflect what's happening to your body that, in turn, affect your body's changes. All of this takes place in a social context. Holding biology and psychology constant, people age differently depending on where and when they live, who they interact with, and what resources they have available to them.

Figure 1.1 captures this complex biopsychosocial interaction. Biological processes refer to how the body's functions and structures change throughout the aging process. We cover these changes in the chapters on normal aging and health.

FIGURE 1.1

The Biopsychosocial Model



According to the biopsychosocial perspective, adult development and aging are understood as involving biological, psychological, and sociocultural influences.

Psychological processes include the individual's thoughts, feelings, and behaviours related to growing older. We examine these changes in the chapters on cognition, personality, and emotions. The social processes of aging reflect the cultural, historical, and interpersonal influences on the individual. We cover these in chapters about relationships, family, work, and institutionalization. In Chapter 2, we will explore how life span development theories grapple with explaining how these complex processes all interrelate. You'll find that there's a great deal more to aging than you probably imagined when you first started reading this chapter.

As you can see from the biopsychosocial model, we intend to go beyond "psychology" in teaching you about the processes involved in adult development and aging. In fact, **gerontology**, the scientific study of the aging process, is an interdisciplinary field. People who devote their professional lives to the study of gerontology come from many different academic and applied areas—psychology, biology, medicine, nursing, sociology, history, and even the arts and literature. It's almost impossible to be a gerontologist without applying this integrative view to your work. Knowledge, theories, and perspectives from all disciplines contribute importantly to the study of the individual over time.

To help put it all together for you as you develop throughout adulthood, we will pay special attention to the concept of **identity**. Identity is defined as a composite of how people view themselves in the biological, psychological, and social domains of life. The interaction of these domains forms an overall view of the "self."

FOUR PRINCIPLES OF ADULT DEVELOPMENT AND AGING

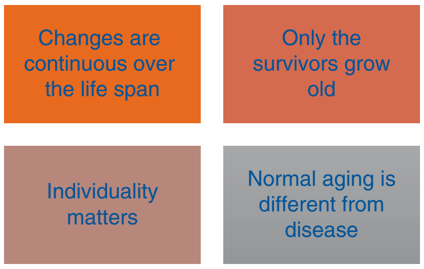
We begin our study of adult development and aging by sharing with you a set of four principles that form the foundation of our biopsychosocial approach (see Figure 1.2). As you read the book, you'll find that we return frequently to these principles, which we highlight when they appear in the chapter. If you begin to understand them now, you will find the course material much easier to master.

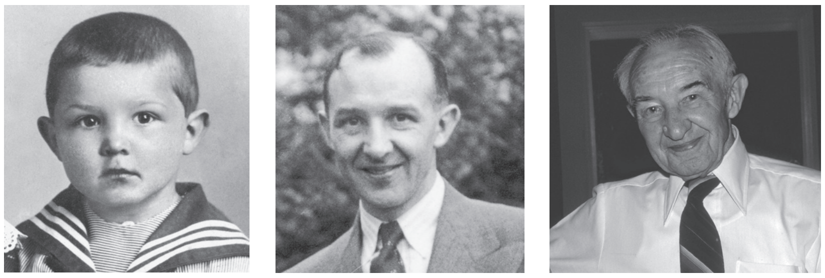
Principle 1. Changes Are Continuous Over the Life Span

First and foremost, changes over the life span happen in a continuous fashion. According to the **continuity principle**, the changes that people experience in later adulthood build on the experiences they had in their earlier years. This means we can never isolate the later years of life without considering the years preceding them. Since time moves in a forward direction, the changes throughout life build upon themselves in a cumulative fashion. If you were hard on your body as a young adult, chances are the changes you'll undergo when you're older will be more negative than if you took good care of yourself.

FIGURE 1.2

The Four Principles of Adult Development and Aging


Changes are continuous over the life span
Only the survivors grow old
Individuality matters
Normal aging is different from disease



Robert L. Zentmaier/Science Source

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Over the progression of time, as shown in these photos of the same man from ages 3 through 82, people may feel the same inside even though their outer appearance changes.

The continuity principle also applies to the way that people think about their own identities. You know that you're the same person you always were, despite getting older. Birthdays don't transform you into a different person. You don't look the same to others, but you feel essentially the same on the inside.

When others look at you, however, they don't necessarily share this perspective. People don't meet you for the first time and think about what you were like when you were younger—they see you as you are now. Unless they are close relatives or friends, they have no way of knowing what you were like when you were in your childhood or teenage years. Anyone meeting you now judges you on the basis of your current appearance, because they have no other data from which to draw.

Similarly, when you look at a middle-aged or older adult, it's unlikely that you judge that person on the basis of how he or she may have been in the past. You see an older woman, perhaps walking with a little difficulty, and don't stop to think that she might have been a marathon runner in her youth. However, that very same older woman knows that she is the "same" person she's always been. She knows her physical abilities have changed, but to herself she's still the Jane, Barbara, or Mary she knows herself to be.

There's an important implication of the continuity principle for anyone working with older adults. You need to remember that they would prefer to be treated as the people they always were, rather than as "old people." As we'll see later, older adults are often stereotyped as weak and infirm, when in reality they want to be viewed as individuals who possess strengths they have built up over their entire lives. They don't want to be stereotyped on the basis of the way they look to the world right now. Some nursing home administrators, eager to remind their employees of this fact, display pictures of the residents from their younger years on the nameplates outside their doors. The residents and their visitors think of them in this way, and it's helpful if those who work with them are reminded of this fact as well.

Principle 2. Only the Survivors Grow Old

The **survivor principle** states that the people who live to old age are the ones who managed to outlive the many threats that could have caused their deaths at earlier ages. Perhaps this is obvious, because clearly, to grow old, you have to not die. However, the survivor principle is a bit more complex than that. Contrary to the Billy Joel song "Only the Good Die Young," it's not the good who die young, but the ones who fall victim to the forces that cause people to lose their lives. Some of these are random, to be sure, such as being killed by someone else in an accident, or by an act of war or a natural disaster. However, many other factors that lead the old to survive death are non-random. Survivors not only manage to avoid random causes of their own fatalities but are also more likely to take care of their health, not engage in risky behaviours (such as driving too fast or getting involved in crime), or using drugs and alcohol excessively.

The survivor principle exemplifies the biopsychosocial perspective. The very fact that survivors avoid death until late in life suggests that they may have inherited good genes or at least managed to maintain their physical abilities (biological factors), are cognitively and emotionally healthy (psychological factors), and have surrounded themselves with a good support system (social factors). Furthermore, these factors build on each other. People with stronger cognitive skills are more likely to attend university, which, in turn, provides them with greater economic resources that can sustain their health and well-being. A combination of mental and physical health and adequate resources, plus a dose of good luck, allow them to be with us today.

Figure 1.3 illustrates the survivor principle. Across the years of adulthood, the population of people born around the same

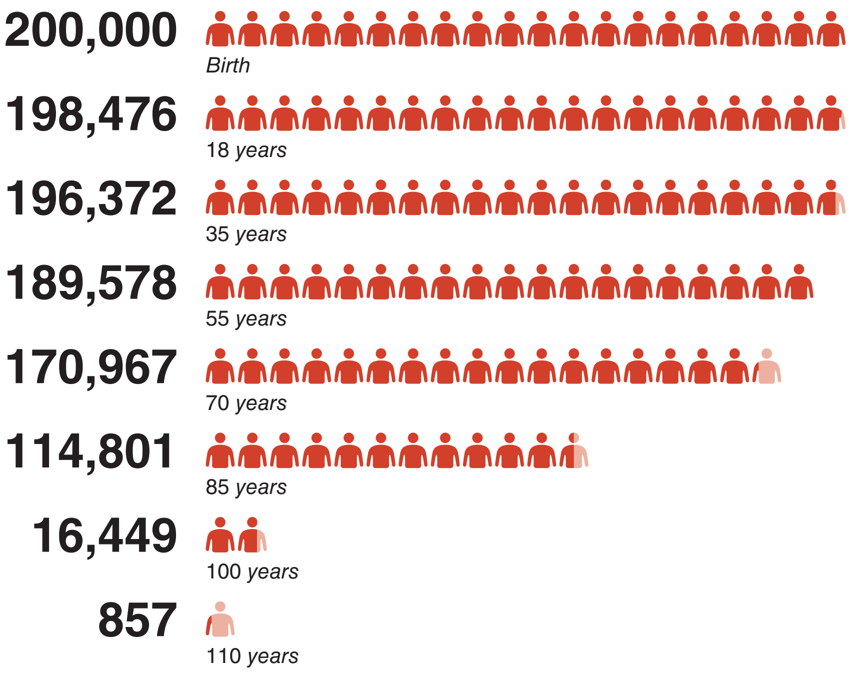


FIGURE 1.3

Expected Survival of Birth Cohort Born in 2020

This figure shows the expected number of people to survive to each age based on calculations for all those born in 2020. As you can see, those who survive to the age of 85 and older represent an increasingly select group of the population.

time thins out so that, by the later years, only the hardiest are still alive. Gerontologists must take the survival principle into account when interpreting the results of their research because it is quite likely that survivors are not like the people born at the same time they were. They may have been born with greater resilience, but they also likely took care to maintain their health and preserve their longevity. There are so many ways to lose one's life as you get older, from such causes as terminal illness or accidents, that to become an older adult, you have to possess some incredibly special characteristics.

The survivor principle also impacts the way we understand research on aging. Clearly, all older adults who participate in research are survivors of the conditions that others did not endure. As time goes by, more and more of the older population will die. When they reach age 90 or 100, they most likely represent a different population from that of their now-deceased age-mates. The older they get, the more select they become in such key characteristics as physical functioning, health, intelligence, and even personality (Baird et al., 2010).

Consequently, when we examine differences between younger and older people, we must keep in mind that older people alive today were a special group when they were young. The younger adults have not yet been subjected to the same conditions that could threaten their lives. Some of them will die before they reach old age. Knowing who will be the survivors is almost impossible to predict, meaning we may be comparing highly select older adults with a wider range of younger adults. Therefore, we cannot conclude that age "caused" the older adults to have the characteristics they have now, because maybe they always were a special subset of their own age group.

To help illustrate this principle, consider data on the psychological characteristic of cautiousness. One of the tried-and-true findings in the psychology of adult development and aging contends that older people are less likely to take risks than are younger people. Similarly, older adults are less likely to engage in criminal behaviour. It's possible that as people age they are better able to avoid behaving in ways that could bring them harm or get them arrested. Alternatively, it's possible that they did not change at all and are the only ones left standing from their generation. The people more likely to make risky decisions early on in life died at younger ages or were imprisoned. Certainly, those who made poor health decisions would be less likely to have survived into old age.

As a result of the survivor principle, you need to remind yourself continually throughout this book that the older adults we study may have become less risky, more honest, or better able to take care of their health. On the other hand, they may not have changed at all—only survived long enough for us to study them.

Principle 3. Individuality Matters

A long-held myth regarding development is that as people age, they all become alike. This view is refuted by the principle of **individuality**, which asserts that as people age, they become more different from each other. This divergence occurs in people's physical functioning, psychological performance, relationships, interest in work, economic security, and personality.

In one often-cited study, still considered relevant, researchers examined a large number of studies of aging to compare the divergence among older versus younger adults on measures of the same characteristics (Nelson & Dannefer, 1992). Research continues to underscore the notion that individuals continue to become less alike from one another with age. Such findings suggest that diversity becomes an increasingly prominent theme during the adult years, a point we will continue to focus on throughout this book.

The idea of increasing divergence among older adult populations does not mean that everyone starts out at exactly the same point when they're young. There are always going to be differences within any sample of people in almost any characteristic you can name. The issue is that as people get older, these differences become magnified. The top-performing person in a sample of young adults may be 10 points higher than the next highest performer. By the time they reach age 70 or 80, these differences may grow by a factor of two, three, or more. In part, this is a statistical fluke. As you'll learn in Chapter 3, it's difficult to find a sample of older adults who are as close in age as are the young adults researchers tend to study (who are often within two or three years of each other). If age is related to performance, then the odds are that the older group will differ simply because they differ more in age.

However, the increasing variation among older adults isn't just a statistical artifact. Even if you had a sample of older adults who were exactly the same age, it's likely that they would differ more among themselves than they would have when they were younger, because they've lived through more experiences affecting everything from their health to their psychological well-being. Those experiences have cumulative effects, causing them to change at different rates and to differing degrees.

Consider what's happened to you and the people you grew up with by this point in your life. You have made the decision to go to university, while others in your age group may have decided to work full time and/or travel. You may meet your future spouse in university, while your best friend remains on the dating scene for years. Upon graduation, some may choose to pursue graduate studies as others enter the workforce. You may or may not choose to start a family, or have already begun the process. With the passage of time, your differing experiences build upon each other to help mould the person you become. The many possibilities that can stem from the choices you make help to illustrate that the permutations of events in people's lives are virtually endless. Personal histories move in increasingly idiosyncratic directions with each passing day, year, and decade of life.

There are actually two types of differences that come into play when we talk about individuality. **Inter-individual differences** are differences *between* people. **Intra-individual differences** refer to the variations in performance within the same individual. In other words, not all systems develop at the same rate within the person. Some functions may increase over time, others decrease, and others stay the same. Even within a construct such as intelligence, an individual may show gains in one area, losses in another, and stability in yet another domain. Intra-individual differences illustrate the fact that development

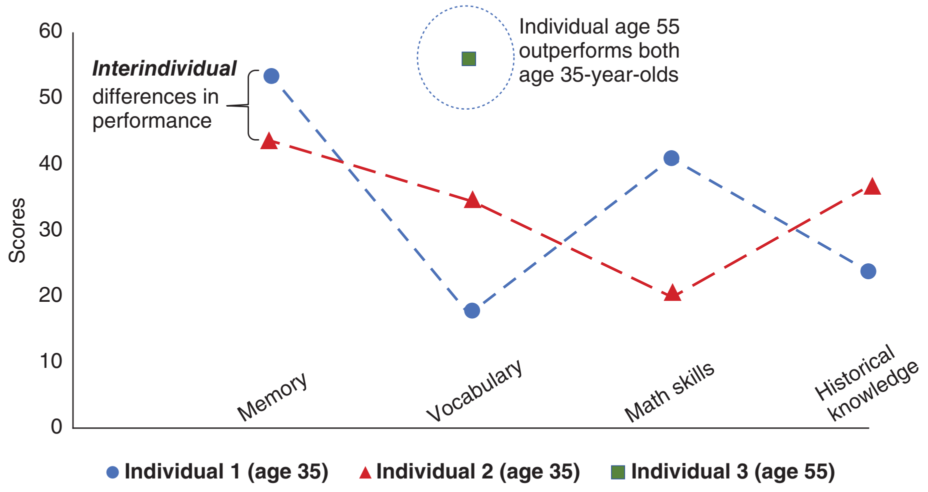
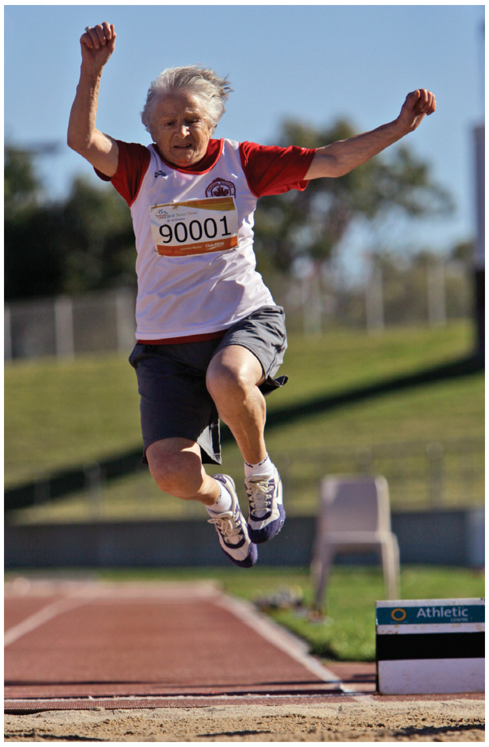


FIGURE 1.4

Inter- and Intra-Individual Differences in Development

These illustrative data from a theoretical study on cognition show how people of the same age show different levels of performance on different tasks (intra-individual variability) but also that on particular tasks, such as vocabulary, older individuals can perform better than younger individuals (inter-individual variability).

can proceed in multiple directions within the same person (Baltes & Graf, 1996), a concept known as **multidirectionality**. Figure 1.4 illustrates inter-individual and intra-individual differences by showing scores of two 35-year-old individuals and one 55-year-old individual on four psychological tests. Inter-individual differences are shown by the points corresponding to each test. Intra-individual differences are shown by the fact that people's scores vary from test to test.



AP Images/RICK RYCROFT

Olga Kotelko was a Canadian track and field athlete who started training at age 77. She held over 30 world records, and, the week before her death in 2014 at age 95, she competed in three events at the Langley Pacific Invitational in Langley, B.C.

Principle 4. "Normal" Aging Is Different from Disease

The principle that **normal aging** is different from disease means that growing older doesn't necessarily mean growing sicker. It is important for both practical and scientific reasons to distinguish between normal aging and disease. Health care specialists who work with middle-aged and older adults need to recognize and treat the onset of a disease rather than dismiss it simply as "getting older." For example, an 80-year-old man exhibiting symptoms of depression can be successfully treated, assuming that the clinician does not write his symptoms off as a feature of normal aging. Personality development in adulthood does not inevitably lead to the depressive symptoms of lowered self-esteem, excessive guilt, changes in appetite, or lack of interest in activities. Clinicians who mistakenly think that these symptoms are part of the normal aging process won't take the proper course of treatment that could alleviate the depressed person's suffering. Gerontologists translate the principle that normal aging is different from disease into terms that distinguish these processes. **Primary aging** (or normal aging) refers to the normal changes over time that occur due to universal, intrinsic, and progressive alterations in the body's systems. Changes over time leading to impairment due to disease rather than normal aging are referred to as **secondary or impaired aging**. These changes are not due to universal, intrinsic processes but are a function of an abnormal set of changes afflicting a segment rather than the entirety of the older population (Aldwin & Gilmer, 1999). Skin wrinkling and discolouration represent primary aging but skin cancer represents secondary aging.

The third type of aging process sets in towards the very end of life, when individuals experience a rapid loss of functions across multiple areas of functioning. This precipitous decline is called **tertiary aging** (Gerstorf et al., 2013). Representing the impact of disease on perhaps already compromised areas of functioning, tertiary aging deserves mention in its own right as distinct from primary or even secondary aging.

Primary, secondary, and tertiary aging refer to processes that accumulate over time and, in the absence of accident or injury,

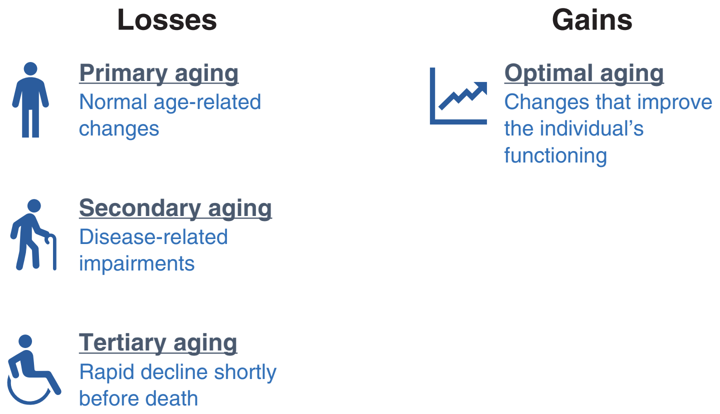

Losses
Gains
Primary aging
Normal age-related changes
Optimal aging
Changes that improve the individual's functioning
Secondary aging
Disease-related impairments
Tertiary aging
Rapid decline shortly before death

FIGURE 1.5

Age-Related Losses and Gains

Normal aging is also referred to as primary aging, which is different from secondary aging related to disease and tertiary aging, which includes the rapid loss of function before death. There are also gains associated with aging referred to as "optimal aging" in which people become better with age in certain functions.

cause the individual's death. Gerontologists believe that despite the changes in the body that lead to loss, aging can also involve gains. The term **optimal aging** refers to age-related changes that improve the individual's functioning. Changes due to optimal aging may reflect the preventive or compensatory measures that adults take to counter the toll that aging would normally take on their physical and psychological functioning. However, some individuals do not make special efforts to alter their own aging, but for reasons not always entirely clear, seem to age at a slower rate than their peers. They may be the ones who never seem to get sick right until the very end of their lives, when a sudden illness leads to their death (i.e., tertiary aging).

Throughout life, age-related losses due to primary, secondary, and tertiary aging eventually overtake age-related gains, as we show in the left side of Figure 1.5. Thus, even while optimal aging can slow the deleterious changes of primary and secondary aging, eventually tertiary aging takes over and the individual's life comes to an end. Remember that, according to the principles of intra-individual and inter-individual variability, the rates of each type of aging vary within individuals and from person to person.

THE MEANING OF AGE

The study of aging implies that age is the major variable of interest. However, the scientific study of aging faces a challenge because age, as a variable, has a number of problems. To be sure, there is value in categorizing individuals in later life based on their age. At the same time, attaching a numerical value to people on the basis of their date of birth carries with it a certain arbitrariness. Chronological age is a number based on measures of the Earth's movement around the sun; however, we don't know how much the changes in the physical universe relate to what goes on inside the body in any kind of precise fashion.

Consider what happens when people's ages change at a major birthday such as reaching the age of 40. The crossing from an age that ends in 9 to an age that ends in 0 may lead people to engage in self-scrutiny just because we've all been socialized to believe that 40 means something important. This belief is reinforced by birthday cards that invoke the "over the hill" metaphor. In truth, your body does not change in discrete fits and starts when you pass a particular birthday.

The body does keep time in a cycle that approximates a 24-hour period, but there is no evidence at the moment to suggest that this time pacemaker is related to aging. To say that chronological age (or time) means anything with regard to the status of the body's functioning is, based on current evidence, questionable. The popularity of such phrases as "30 is the new 20" and "60 is the new 50" capture the difficulty of defining age based solely on a number. Chronological age does have some value in describing a person, but like other descriptive features of a person, such as gender or eye colour, it is the social meaning attached to chronological age that often outweighs any intrinsic usefulness. As we have already discussed, people of the same age can vary substantially from one another, and people of different ages can be more similar to each other than their differing age might lead you to expect.

Using Age to Define "Adult"

Now that we have you thinking about the meaning of age, we will move on to the next challenge—the meaning of the word "adult." Earlier, we asked you to decide whether you consider yourself an adult. When you think of that word, perhaps the synonym "mature" comes to mind. This, in turn, may conjure up images of a person reaching a certain level of accomplishment or growth. Consider, for example, the term "mature" in reference to an apple. A mature apple is one that is ready to be eaten, and you can judge that by examining the apple's colour, size, and texture. An apple's maturity level is relatively easy to measure compared with judging the maturity of humans, because the complexity of the biopsychosocial processes is far more difficult to quantify.

You might think that the most logical definition of maturity should be based on physical development. Yet you also know that girls and boys that have passed through puberty in their teenage years would, in contemporary Western society, be regarded as anything but an adult. Although his physical attributes define him as an adult, the psychological and social standards would not.

Perhaps a standard based on ability is a better option. Consider 16 years, the age when most people can legally drive.

Or, alternatively, consider the age 18, when Canadian society gives a person the right to vote. Using the age of 18 or 19, depending on the province, presents another possible point of entry into adulthood. Because it is the age when Canadians can legally drink alcohol, turning 18 or 19 for many represents a defining mark of the beginning of adulthood. However, some countries set higher or lower age limits. For example, the United States is in a small minority of nations that have set the drinking age at 21. Some countries, such as Germany, Barbados, and Portugal, use the age of 16. These conflicting age demarcations for even such a seemingly concrete behaviour as drinking alcohol show that deciding when a person is an adult on this basis has very limited utility.

Parenthetically, the variation around the legal drinking age shown from country to country (and even within a country) shows the interaction of biological and sociocultural factors in setting age-based parameters around human behaviour. People 18 years old in Canada are, on average, not all that physiologically distinct from people 18 years old who live in France. For that matter, they are probably not even psychologically different. It's the culture that distinguishes whether they're able to drink alcohol without getting arrested.

In another example, the age of 21 is when you can typically rent a car. Drivers between the ages of 21 and 24 may face specific restrictions when renting a car, and/or may face additional fees. These ages have no inherent meaning, but are used for car rental purposes because the chances of having an auto accident are lower after the age of 25. It's highly unlikely that a switch is flipped on at a person's 25th birthday so that the unsafe driver now has become a model of good behaviour on the road. However, there are statistically higher odds that people under age 25 are more likely to engage in the risky combination of drinking and driving, which is what leads to higher insurance premiums.

Another set of criteria related to the age of adulthood pertains to when people can marry without the consent of their parents. There again, we find huge variation. Within Canada alone, the age of consent varies from province to province (in Quebec it is 16 without parental consent, while other provinces deem 18 or 19 the appropriate age). Moreover, the age when people actually marry reflects factors such as the health of the economy: in bad economic times, the median age of marriage goes well above the age of consent. During these times, people in their 20s (or older) may find they're forced to move back in with their parents because they aren't earning sufficient income to afford their own place. Does that mean that people become less "adult" when the economy lags?

Given these contradictory definitions of "adult," it might be wise to recommend that we set the entry into adulthood on the basis of the individual's having reached the chronological age associated with the expectations and privileges of a given society or subculture. For example, in Canada, individuals may be considered to have reached adulthood at the age when they are eligible to vote, drink, drive, and get married. For the majority of Canadian provinces, the age of 18 or 19 is therefore considered the entry point for adulthood. In other countries, such as the United States, these criteria may be met at the age of 21. Regardless of the varying definitions, the first three or four years of adulthood represent the period of "emerging adulthood," or the transition prior to assuming the full responsibilities associated with adulthood, normally the years 18 to 29 (Arnett, 2000).

Divisions by Age of the Over-65 Population

Traditionally, 65 years of age has been viewed as the entry point for "old age." Gerontologists recognized long ago that not only was 65 an arbitrary number for defining old age, but that it also resulted in people being placed into too broad a category when defined as older adults. All things being equal, a 65-year-old faces very different issues from those faced by someone who is 85 or 90. There are certainly 65-year-olds in very poor health and 95-year-olds who have no serious ailments. But because 65-year-olds are, on average, so different from those who are 20 or more years older, we use a convention to break the 65-and-older category into subgroups.

The subgroups most frequently used in gerontology are **young-old** (ages 65 to 74), **old-old** (ages 75 to 84), and **oldest-old** (ages 85 and older). We shouldn't place too much credence on numbers, as we've already said, but these are good approximations for roughly categorizing the 65-and-older population. Bernice Neugarten, one of the early pioneers in psychological gerontology, proposed these distinctions in the mid-1960s, and they have remained in use to this day even though 85 may be the "new" 65 with the oldest-old being in better health than they were 50 years ago (Neugarten, 1974).

With more and more people living to the oldest-old category as defined in this manner, gerontologists are re-examining the divisions of the 65+ age group. Specifically, people over the age of 100, known as **centenarians**, are becoming more and more commonly represented in the population, as we will show later in the chapter. It will not be long before the very highest age category—the *supercentenarians*, who are 110 and older—becomes more prominent. Typically, the oldest person in the world at any given time is between the ages of 114 and 116. Jeanne Louise Calment, the oldest documented living human, was 122 at the time of her death. Supercentenarian will probably retain its definition as 110 and over, though, at least for the foreseeable future.

Functional Age

Discontented with the entire concept of chronological age, a number of gerontologists are devising a new classification system that is based not on what the calendar says but on **functional age**, which is how people actually perform (see Figure 1.6). With functional instead of chronological age as the basis for a system of studying aging, we could gain a better grasp of a person's true characteristics and abilities. In Chapter 3, when we talk about research methods, we'll see further advantages of using measures other than chronological age to study the aging process.

Biological age is the age of an individual's bodily systems. Using biological age instead of chronological age would tell us

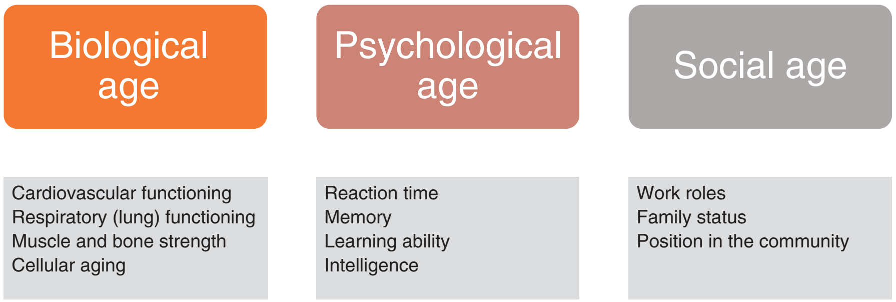


FIGURE 1.6

Measures of Functional Age

Functional age measures use scores on given indicators to represent age rather than chronological age.

exactly how well people are able to perform such vital functions as pumping blood through the body and getting oxygen to the lungs. With biological age, you could also help people learn how best to improve their muscle and bone strength, for example. In order to be able to use biological age as an index, we would need a large repository of data showing what is to be expected for each major biological function at each age. For example, we'd need to know the population values for blood pressure readings in people with different chronological ages. Then, we would assign people a "blood pressure age" according to which chronological age of healthy people their numbers most closely match. A 50-year-old whose blood pressure was in the range of normal for 25- to 30-year-olds would then have a biological age that was 20 or 25 years younger than his or her chronological age.

Popular culture has certainly caught on to the notion of biological rather than chronological age. There are a multitude of online calculators in which you answer various questions to estimate how long you will live. In addition, there are slightly more sophisticated "biological age tests" that let you calculate your "lung age," for example. Another, far more sophisticated approach involves measuring cellular aging. When exposed to harmful environmental conditions, the body's cells undergo important changes affecting their ability to function normally. By indexing these changes, researchers can develop a scale that assesses biological functioning at this very basic level (Hannum et al., 2013).

Psychological age refers to the performance an individual achieves on measures of such qualities as reaction time, memory, learning ability, and intelligence (all of which are known to change with age). Like biological age, a person's performance on these tasks would be compared with those of other adults, and then scaled accordingly.

Social age is calculated by evaluating where people are compared to the "typical" ages expected for people when they occupy certain positions in life. These positions tend to centre on family and work roles. For example, a grandparent would have an older social age than would a parent, although the grandparent might easily be chronologically younger than the parent.

Social age can have some interesting twists. For example, people can be grandparents in their late 20s (with a social age of 60 or older). Conversely, women can become mothers in their late 60s. Perhaps you have a friend whose grandmother is 93 and another whose grandmother is 57. We see the same issue with regard to work roles. A 70-year-old who is still working has a younger social age than a 66-year-old who has retired. Athletes and politicians present a similar contrast. A gymnast may be forced to give up her sport at 18 years of age and thus have an older social age than a still-employed legislator who continues to win elections into her 70s.

As stated earlier, an advantage of using functional indices of aging is that they can be more accurate than chronological age. Of course, it's much easier to use chronological age than to use these more sophisticated calculations. Furthermore, functional ages must be constantly calibrated and recalibrated to ensure that they continue to be accurate. For example, a biological index based in part on blood pressure may require adjustments as health practitioners change the definition of what is considered "normal." Changes in both medical knowledge and population norms for particular age groups may mean that the definition of an average 60-year-old's blood pressure shifts so that it would now be more typical of a person in the 70s. Psychological age and social age indices are also likely to change over time. Despite its faults, chronological age may be the most expedient index for many areas of functioning, as long as we keep in mind that it does not tell the whole story.

Personal Versus Social Aging

The aging process occurs within the individual, but as you have learned already, it is shaped by events occurring in the individual's social context. When developmental psychologists study the aging process, it is difficult to disentangle those internal changes from those that reflect a changing world, though we try to do so by applying the appropriate controls in our research.

Personal aging refers to changes that occur within the individual and reflect the influence of time's passage on the body's structures and functions. This is how people ordinarily think of the aging process, and, indeed, it is what is implied in primary, secondary, and tertiary aging.

Social aging refers to the effects of a person's exposure to a changing environment. Over time, then, the changes we see within the individual represent the unique blend of personal and social aging as these play out in that individual's life.

Within the category of social aging, the changes that take place in an individual's life can reflect a multitude of interacting factors. At any one time, the individual's life reflects one or more of three basic categories of social influences. These influences, identified by psychologist Paul Baltes (1979) and still seen as relevant today, include normative age-graded influences, normative history-graded influences, and non-normative influences. We'll look at each of these in turn.

Normative age-graded influences lead people to choose experiences that their culture and historical period attach to certain ages or points in the life span. The term *normative* stems from the term *norm*, which is a social expectation for behaviour. In Western society, age norms traditionally dictate that individuals graduate from university when they are in the early 20s, get married and begin a family in the 20s or 30s, retire in the 60s, and become grandparents in the middle to later years, usually in the decades of the 50s, 60s, and beyond. These are influences on behaviour to the extent that people believe that they should structure their lives according to these age demarcations.

Events that occur in response to normative age-graded influences occur in part because a given society has developed expectations about what is assumed for people of certain ages. The decision to retire at the age of 65 can be seen as a response to the norm, more true perhaps in the past than today, that 65 is the correct age to leave the labour market. Graduation from high school generally occurs at the age of 18 years for most because in most industrialized societies, children start school at the age of 5 or 6 and the educational system is based on 12 or 13 grades.

Normative age-graded influences exert their impact because people are socialized into believing that they *should* structure their lives so that they conform to these influences. When people don't adhere to these norms, for whatever reasons, they feel that there is something wrong with them. For example, a 40-year-old office worker may consider retiring but feel reluctant to do so because it is not what is expected for a person of that age in that field of employment. Similarly, a 35-year-old may prefer not to marry or to have children, but feel pressured into doing so by other family members, friends, or the society at large by virtue of having reached the mid-30s.

The normative age-graded influences are partly linked to the biological aging process. Parenthood traditionally occurs between the ages of 20 and 40, at the peak of a woman's reproductive cycle. This age range sets the normative age period for biologically becoming a parent. Once this age is set, then a lower limit is set on the age at which the adult can become a grandparent. If the child also follows a normative age-graded influence, the parent will likely become a grandparent for the first time between the ages of 55 and 65 years. Similarly, manual labourers or athletes may be at peak physical capacity up to their 40s, when they experience loss of strength and speed.

Now let's turn to the second set of influences on development, those that relate to the impact of events in the outside world on the individual. **Normative history-graded influences** are events that occur for everyone within a certain culture or geopolitical unit (regardless of age) and include large-scale occurrences such as world wars, economic trends, or sociocultural changes in attitudes and values. One such example is a natural disaster that impacts thousands of people living in a particular location or area of the world. The ice storm (shown in the photo) of 1998, that lasted five days, affected large parts of Ontario, Quebec, and New Brunswick, causing widespread damage to infrastructure, 35 deaths, and 1,000 injuries. The impact of these events on people's lives may be felt immediately. They can continue to have a lasting impact for many years on the subsequent patterns of work, family, and quality of life of the people affected by those events.

An individual does not have to experience a historical event directly to be affected by a normative history-graded influence. For example, a terrorist attack or a mass shooting not only creates victims but also has wider influences on a society's sense of security. For example, the mass shooting of 14 women in 1989 at the École Polytechnique at the Université de Montréal is remembered annually on December 6 across Canada. Anytime there is a significant event or set of events affecting a large number of people, the event's aftermath may continue to impact aspects of each person's life for years to come.

If the life course was influenced only by normative age- and history-graded influences, predicting the course of development of people of the same age living in the same culture would not be easy, but would be a manageable problem. Plug in a person's age and the year of the person's birth, and you'll be able to

C. Lee Parrish/Shutterstock

The devastating effects of the ice storm impacted thousands of people, providing an example of normative history-graded influence.

figure out which combination of age-graded and history-graded influences set the course of that person's life. However, people's lives are also affected by **non-normative influences**, which are the random idiosyncratic events that occur throughout life. They are "non-normative" because they occur with no regular predictability.

There are an almost infinite number of examples of non-normative influences. Some are due to good luck, such as winning the lottery or making a smart investment. Non-normative influences can also be negative, such as a car accident, fire, or the untimely death of a relative. One moment your life is routine and predictable, and in the next, a single event irrevocably alters it. Other non-normative influences may unfold gradually over a period of time, such as being fired from a job (due to personal, not large-scale economic, reasons), developing a chronic illness not related to aging, or going through a divorce. In everyday language, you talk about someone benefiting from the "right place, right time" effect or, conversely, suffering a negative fate from the opposite set of coincidences.

As you have read about the various types of influences on life, it may have crossed your mind that the way in which they interact with each other is also important. Consider the example of divorce. Although society's norms have changed considerably regarding this life event, many would still consider this a non-normative occurrence because the norm (and certainly the hope) of married couples is to remain married. And although a divorce is a personal occurrence, it may be seen in part as a response to larger social forces. For example, a couple that is exposed to financial hardship because one or both partners lost a job due to living in harsh economic times (normative historical influence) is now faced with severe emotional stress. If they are in their middle years, when couples are expected to have reached a degree of financial comfort (age-graded normative influence), their problems may be exacerbated. Yet some couples may feel closer to each other when exposed to such adversity, and this is where the idiosyncratic non-normative factors come into play.

This example illustrates the dilemmas faced by researchers in human development who attempt to separate not only personal from social aging but also the impact of particular influences that fall into the category of social aging. Though challenging, the very complexity of the equation fascinates those of us who try to understand what makes humans "tick" and what causes that ticking to change over the decades of the human life span.

KEY SOCIAL FACTORS IN ADULT DEVELOPMENT AND AGING

As we've just seen, social factors play an important role in shaping the course of our lives. Here we make explicit exactly how we define and use the key social factors that we will refer to in this book.

Sex and Gender

In discussing the aging process, it is important to note that there are important male–female differences related to the socialization experiences of men and women. We will use the term **gender** to refer to the gender that a person feels internally (i.e., gender identity) along the gender spectrum. Gender is distinct from biological **sex** (also referred to as sex at birth; Statistics Canada (2020h), which refers to the individual's inherited predisposition to develop the physiological characteristics typically associated with maleness or femaleness. Both sex and gender are important in the study of adult development and aging. Physiological factors relevant to sex influence the timing and nature of physical aging processes, primarily through the operation of sex hormones. For example, the sex hormone estrogen is thought to play at least some role in affecting a woman's risks of heart disease, bone loss, and possibly cognitive changes.

Social and cultural factors relevant to gender are important to the extent that the individual assumes a certain role in society based on their gender identity. Opportunities in education and employment are two main areas in which gender influences the course of adult development and becomes a limiting factor for women. Although progress has certainly occurred in both domains over the past several decades, women continue to face a more restricted range of choices and the prospects of lower earnings than do men. Furthermore, these differences are important to consider when studying the current generation of older adults, as they were raised in an era with more traditional gender expectations.

The phenomenon of transgendered individuals (i.e., those who adopt the sex other than what they were born with) is too recent to have produced enough information relevant to aging. We might expect that this will become an area studied by gerontologists, particularly because it also highlights the role of social influences on development. Prior to the decade of the 2010s, there was relatively little social awareness of the experience of transgendered individuals and aging but this is rapidly changing (Kimmel et al., 2015).

Ethnicity

A person's ethnicity can be defined in many ways, including ancestral origin, homeland, and a shared history, identity, language, religion, or culture. Canada is characterized by "cultural dualism," which recognizes the historical colonization by French and English people, and is reflected in legislation and policies in many different areas, including language, education, and the institutional rights of provinces. For example, the *Official Languages Act* of 1969 made Canada an officially bilingual country. Canada has become increasingly multicultural, and, in 1971, multiculturalism became an official policy. In 2016, over 250 ethnic origins or ancestries were reported by the Canadian population and 4 in 10 people reported more than one origin (Statistics Canada, 2017f).

Statistics Canada (2019l) defines the **immigrant population** as persons who are, or who have ever been, landed immigrants or permanent residents. Persons who are Canadian citizens by naturalization are also immigrants. The term **visible minority**, as defined by the *Employment Equity Act*, is defined as "persons, other than Aboriginal peoples, who are non-Caucasian in race or non-white in colour" (Statistics Canada, 2020j).

In Canada, the visible minority population is composed primarily of the following groups, in order of size: South Asian, Chinese, Black, Filipino, Latin American, Arab, Southeast Asian, West Asian, Korean, and Japanese (Statistics Canada, 2017c). In addition, Aboriginal populations are composed of three distinct groups: First Nations, Inuit, and Métis.

Ethnic differences in functioning in adulthood and aging may reflect differences in genetic inheritance. People who have inherited a risk factor that has been found to be higher within a certain ethnic group, for example, are more likely to be at risk for developing that illness during their adult years. Genetic risk factors may also interact with different ethnic backgrounds. For example, people at risk for a disease with a metabolic basis (such as the inability to metabolize fats) will be more likely to develop that disease depending on whether cooking foods high in fat content is a part of their culture.

Ethnicity is a fluid construct that changes in response to the social context (Chappell et al., 2008). In addition, ethnic background may also alter an individual's development in adulthood through the structure of a society and whether there are systematic biases against people who identify with that ethnic background. As we will demonstrate throughout this book, there are significant physical and mental health disparities, with the prevalence of many illnesses higher among the Aboriginal population than among the non-Aboriginal population. Rosenberg et al. (2009) compared Aboriginal and non-Aboriginal older adults and found that Aboriginal older adults were more likely to rate their health as "poor or fair" and had more chronic conditions. The reasons for this disparity are complex but relate, in part, to the fact that older Aboriginal people are more likely to reside in rural and remote communities, where access to health care is often compromised. They also experience language barriers, as health care workers are often non-Aboriginal. Cultural biases and misunderstandings are significant obstacles for Aboriginal older adults. For example, traditional healing methods may be overlooked in favour of Westernized medical practice, and this has serious and negative implications for the health of older Aboriginal people (Rosenberg et al., 2009).

Ethnicity is often studied in adult development and aging as an influence on a person's familial attitudes and experiences. People of certain ethnic backgrounds are thought to show greater respect for older adults and feel a stronger sense of obligation to care for their aging parents. For example, among Chinese people, the Confucian philosophy of filial piety refers to the need to respect one's parents and ancestors. This philosophy has been shown to influence the caregiving relationship in Chinese-Canadian families. In his research, Lai (2007) has shown that Chinese-Canadian caregivers who had higher levels of filial piety had lower levels of caregiver burden.

Socioeconomic Status

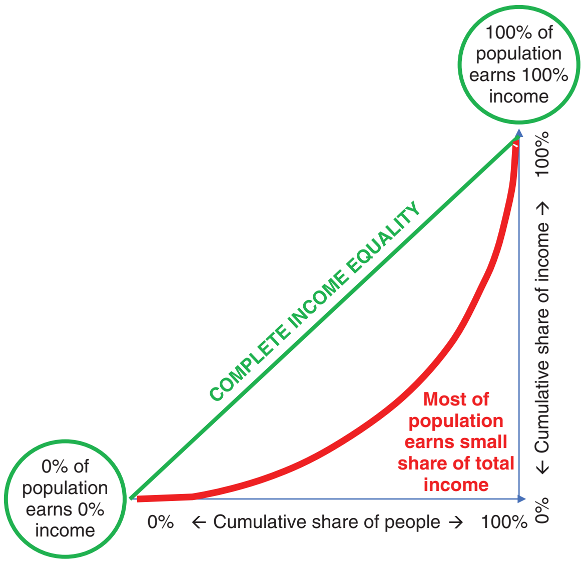
Socioeconomic status (SES), or "social class," reflects people's position in the educational and occupational ranks of a society. Technically, SES is calculated through a weighted formula that takes into account a person's highest level of education and prestige level of his or her occupation. However, there is no one set way to calculate SES. Various researchers have developed scales of socioeconomic status that give differing weights to these values in coming up with a total score. People with higher levels of education tend to have occupations that are higher in prestige, and so some researchers use level of education alone as the index of SES.

Income levels are not necessarily associated with socioeconomic status. High-prestige jobs (such as teaching) are often associated with mid- or even low-level salaries. However, as a proxy for or in addition to SES, some researchers use income as the basis for analyzing social class differences in health and opportunities. Income inequity can be expressed in statistical terms. Figure 1.7 illustrates the **Gini coefficient**, an index of income inequality in a given economy. If income is equally distributed, 100 percent of the population earns 100 percent of the accumulated wealth. Income inequality is reflected when a smaller percent of the population earns a higher proportion of the wealth, such as when 10 percent of the population earns 90 percent of the wealth. In the United States, the Gini coefficient has risen steadily since 1990, indicating the consolidation of wealth in the upper-income brackets. However, in Canada the Gini coefficient rose in the 1990s but has remained quite stable since then.

SES is an exceptionally important, but often unrecognized, influence on the aging process. In our book, we will highlight studies that connect aging with SES. One in particular stands out because of its size, length of time of follow-up, and complexity.

FIGURE 1.7

Gini Coefficient


100% of population earns 100% income
COMPLETE INCOME EQUALITY
Most of population earns small share of total income
0% of population earns 0% income
0% ← Cumulative share of people → 100%
0% ← Cumulative share of income → 100%

The Gini coefficient makes it possible to classify an economy according to the distribution of its wealth. The green line of complete income equality occurs when income is distributed equally across the population. The red curve shows an economy characterized by inequity in which a small percentage of the population earns the largest share of income as when the wealthiest 10 percent of the population earns 90 percent of the income generated in that economy.

This is the landmark investigation known as **Whitehall II**, a survey of a large sample of British adults focusing on the relationships among health, social class, and occupation. The original Whitehall study was established in 1967, involving 18,000 men working in civil service occupations in the United Kingdom. This study showed that men in the lowest employment brackets had poorer health than their health habits would predict. Whitehall II was initiated by Sir Michael Marmot in 1985 to investigate specifically social and occupational influences on health and illness including psychological workload, control over work pacing and content, opportunity for using one's skills, and social support at work. Sir Marmot currently chairs the Commission on Equity and Health Inequalities in America and was Chair of the World Health Organization's Commission on Social Determinants of Health. Whitehall II continues to produce important findings that we will share throughout the text.

Religion

Religion, or an individual's identification with an organized belief system, is surprisingly one of the least well-understood but presumably important influences on aging. Organized religions form an alternative set of social structures that transcend nationality and that, additionally, are partly connected with ethnicity. More importantly, religion provides many people with a source of coping strategies, social support in times of crisis, and a systematic basis for interpreting life experiences (Klemmack et al., 2007).

Religion is distinct from spirituality, or the set of beliefs that an individual holds about such areas as the afterlife, a sense of meaning in life, and feelings of connections to others. Spirituality and its relationship to psychological well-being in later life is becoming an increasing focus of researchers in the field and will undoubtedly grow in importance over the coming years (Tomás et al., 2015).

THE BABY BOOMERS GROW UP: CHANGES IN THE MIDDLE-AGED AND OLDER POPULATIONS IN CANADA AND THE WORLD

A quick snapshot of the Canadian population according to age and sex appears in Figure 1.8 (Statistics Canada, 2019d). The age–sex structure provides a useful way of looking at the population. A "young" population is shaped like a pyramid, an "old" population is depicted by an upside-down pyramid, and a population considered stable is shaped like a rectangle.

You can clearly see in this figure the prominence of the **baby boom generation**, the term used to describe people born in the post–World War II years between 1946 and 1964. The term *baby boom generation* was coined to reflect the huge increase in babies born to couples after servicemen returned home from the war. The boom continued until the early 1960s, during years of economic prosperity. We now have several other terms for generations of Canadians born in other decades, including the "Silent Generation" (those in their teens in the 1950s), the "Greatest Generation" (those who fought in World War II), "Gen X," (the children of the baby boomers), and the Millennials, also called "Gen Y," born in the 1990s at the tail end of the Gen Xers. The assumption with this terminology is that you are defined in important ways by the year of your birth, clearly an overgeneralization. Nevertheless, the terms persist and at least for the baby boomers, they will most likely never go away.

Figure 1.8 clearly shows the influence of the baby boom generation as a "bulge" in the age range of those who are now in their 50s and 60s. What's important about the baby boom generation, apart from whatever it might mean in terms of defining any one individual, is the preponderance of individuals of similar ages moving through the population together. Not only do these groups share certain historical events, but they also create their own set of dilemmas (Whitbourne & Willis, 2006). We will learn later in the book about the implications for the economy, for example, of having so many people reach their 60s at similar times.

Canada

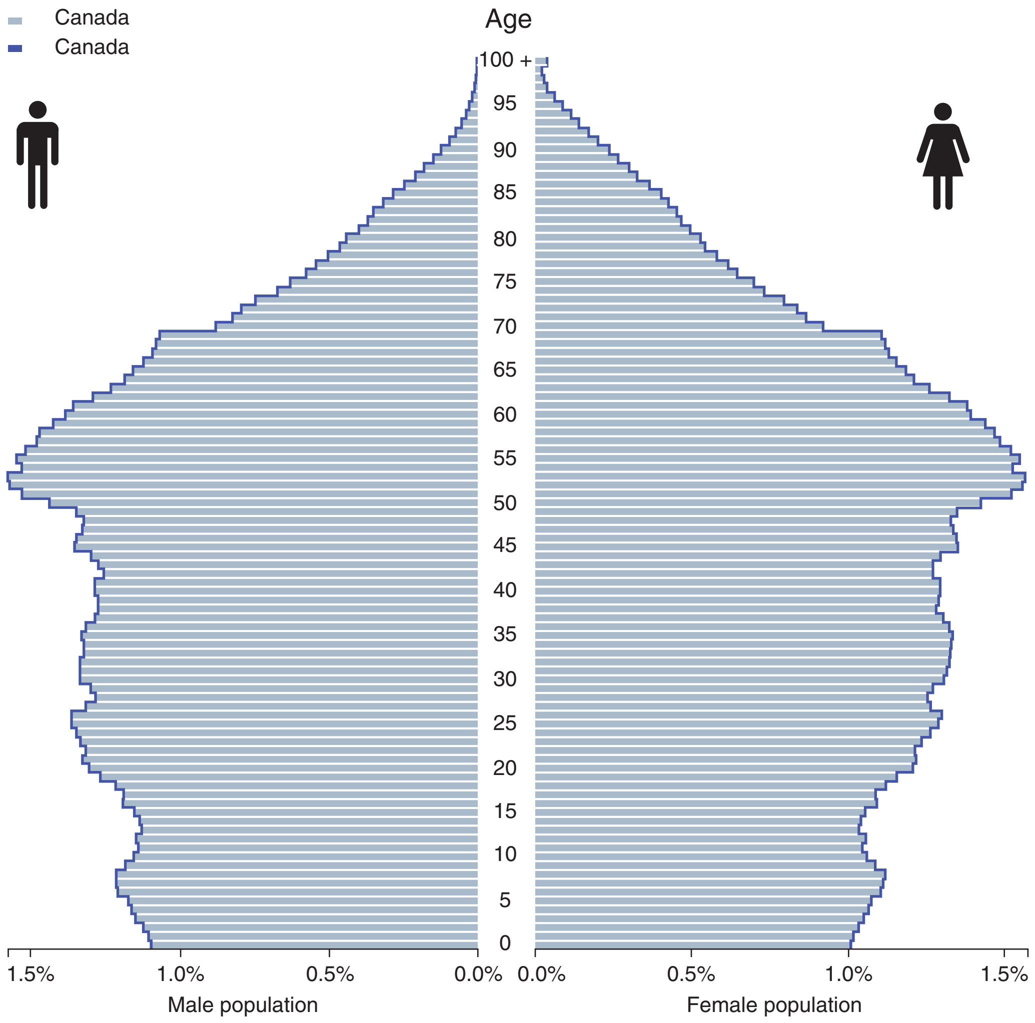
In 1921, the number of Canadians who were age 65 and older made up about 5 percent of the population (Kembhavi, 2012). By July 1, 2019, this had increased to 17.5 percent. There is significant regional variation, with the largest percentage of older adults residing in Newfoundland and Labrador (21.5 percent) and the lowest percentage in Nunavut at 4.0 percent with nearly one-third (31.8 percent) aged 0 to 14 (Statistics Canada, 2019a). Figure 1.9 illustrates the demographic growth rate by age group between 1982 and 2012. Clearly, the most dramatic growth rates are for those persons who are 85 and older, followed by those who are 80 to 84.

By 2036, Statistics Canada estimates that older adults will account for about one-quarter of the population (Statistics Canada, 2010). Perhaps most impressive is the estimate in the growth in the number of centenarians. The number of centenarians has tripled since 2001, and for the first time there are over 10,000 centenarians. The vast majority of them are women due to their increased life expectancy (82 percent; Statistics Canada, 2019a). Among the G7 countries, Canada and the United States have the most centenarians at 29 per 100,000 persons, second only to Japan with 56 per 100,000 persons (Statistics Canada, 2019a). Centenarians were born at a time when Canada was close to five times smaller. Some were young children during World War I and others likely entered the workforce, married, and started families during the Great Depression. Thus, many of them experienced a unique set of circumstances that likely shaped who they are today.

The major explanation for these large increases in the 65 and older population can be accounted for by the movement of the baby boomers through the years of middle and later adulthood. Important to consider is not just that these individuals were born during a period of high birth rates, but that they are expected to live into their 80s, 90s, and 100s, increasing the numbers of very old individuals society will experience throughout the century.

FIGURE 1.8

Canadian Population by Age and Sex, 2016



Source: From Statistics Canada. (2019d). *Comparison Age Pyramid*. Ottawa, ON: Author. Retrieved from https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/pyramid/pyramid.cfm?type=2&geo1=01&geo2=01.

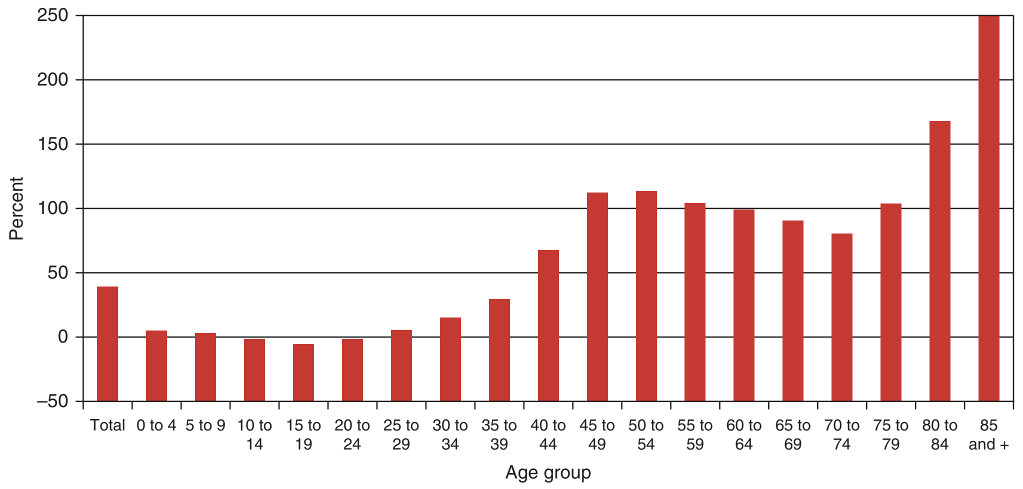
Increases in the aging population reflect the vast advances that have taken place in the average length of life. **Life expectancy** is the average number of years of life remaining to the people born within a similar period of time. To calculate life expectancy, statisticians take into account death rates for a particular group within the population and use these figures to project how long it will take for that entire group to die out completely. Life expectancy is not the same as **life span**, which is the maximum age for a given species. The life span of humans has not changed, but more people are living to older ages, leading to the life expectancy increase we are currently witnessing.

Overall life expectancy in Canada at birth is 79.9 years for men and 84 years for women (Statistics Canada, 2019a). This is a major increase from the early 1920s, where life expectancy at birth was 58.8 years for men and 60.6 years for women (Statistics Canada, 2018c). Many factors have contributed to increases in life expectancy, including reduced death rates for children and young adults. People are also living longer once they reach the age of 65, at which point the life expectancy becomes 18.8 years for men and 21.7 years for women (Statistics Canada, 2013b).

A related concept is **health-adjusted life expectancy**, which is the number of years a person could expect to live in good health if current mortality and morbidity rates persist. In 2015, health-adjusted life expectancy, which indicates how many years a Canadian can expect to live in fairly good health, was 69 for men and 70.5 for women (Bushnik et al., 2018). The ideal situation in a given society is that individuals have both long health and life expectancy, meaning that they are able to be productive and free of chronic illness until close to the time that they die. This is also called **compression of morbidity**, meaning that the illness burden to a society can be reduced if people become disabled closer to the time of their death (Vita et al., 1998).

FIGURE 1.9

Growth Rate (in percentage) of Age Groups Between 1982 and 2012



Source: From Statistics Canada. (2012a). *Annual demographic estimates: Canada, provinces and territories, 2012.* (Catalogue no. 91-215-X.) Retrieved from www.statcan.gc.ca/pub/91-215-x/91-215-x2012000-eng.pdf

Geographic Variations Within Canada

As you can see from Table 1.1, the over-65 population in Canada is very unevenly distributed geographically. As of 2019, the territories had the smallest percentage of people 65 years and older, with a low of 4.0 percent in Nunavut. In contrast, the largest percentages of those 65 and older are found in the Atlantic provinces, Quebec, and British Columbia (Statistics Canada, 2019a). There is also significant variability across cities, with Victoria having a high percentage of older adults (21 percent) and Calgary much lower (11.2 percent) (Statistics Canada, 2017b, 2017l). In smaller communities like Qualicum Beach on Vancouver Island, over half (52.1 percent) of people are age 65 and older (Statistics Canada, 2017k)! Not only is there great geographic diversity, but there is also variability across communities in providing for the specific needs of elderly Canadians.

TABLE 1.1

Population Estimates, Age Distribution, and Median Age in Canada as of July 1, 2019

	Population number	*0 to 14 years %*	*15 to 64 years %*	*65 years and over %*	*Median age years*	*Mean age years*
Canada	**37,589,262**	**16.0**	**66.5**	**17.5**	**40.8**	**41.2**
Newfoundland and Labrador	521,542	13.7	64.9	21.5	47.1	44.5
Prince Edward Island	156,947	15.6	64.6	19.7	43.2	42.4
Nova Scotia	971,395	14.1	65.2	20.8	44.9	43.6
New Brunswick	776,827	14.4	64.3	21.3	46.0	44.1
Quebec	8,484,965	15.8	65.0	19.3	42.6	42.4
Ontario	14,566,547	15.7	67.1	17.2	40.4	41.1
Manitoba	1,369,465	18.9	65.4	15.6	37.4	38.9
Saskatchewan	1,174,462	19.6	64.7	15.7	37.4	39.0
Alberta	4,371,316	18.8	68.0	13.3	37.1	38.3
British Columbia	5,071,336	14.1	67.2	18.7	42.4	42.4
Yukon	40,854	16.9	70.4	12.7	39.2	39.4
Northwest Territories	44,826	20.2	71.6	8.3	32.1	35.9
Nunavut	36,780	31.8	64.2	4.0	26.2	28.5

1. Preliminary postcensal estimates.

Note(s): Figure in percent may not add up to 100 percent as a result of rounding.

Source: From Statistics Canada. (2019a). Annual demographic estimates: Canada, provinces and territories. Retrieved from https://www150.statcan.gc.ca/n1/pub/91-215-x/91-215-x2019001-eng.pdf

Ten provinces recognize the need to support older adults as they age in what have been called "age-friendly" communities (Public Health Agency of Canada, 2016). These are places where physical and social environments support active aging, helping older adults live healthy and engaged lives. For example, age-friendly communities have outdoor spaces that are accessible and well designed for older adults, public transportation that is affordable and accessible, adequate health and community supports, and opportunities for social interaction.

Gender and Ethnic Variations in the Over-65 Population

As shown in Figure 1.10, the numbers of men and women in Canada are quite comparable. However, between the ages of 65 and 79 there were 91.8 males per 100 females. For those aged 100 and over, the sex ratio is even greater, with 21.9 males per 100 females. Life expectancy gains have been more rapid for men than for women, and the gap in numbers between men and women is narrowing (Statistics Canada, 2019a).

Changes are also evident in the diversity of the population. The 2016 Census indicated that 22.3 percent of the Canadian population were visible minorities and 12.6 percent of these were 65 years of age and over (Statistics Canada, 2016). Among older adults, the largest visible minority groups were Chinese (29 percent) and South Asian (27 percent). Most older adults come to Canada through the Family Class or Family Sponsorship program, often to assist their children in providing child care. Many older family members who come to Canada face language barriers and a variety of new customs and traditions, making them vulnerable to loneliness (de Jong Gierveld et al., 2015). They are also likely to experience health and mental health inequities (Guruge et al., 2015; Wang et al., 2019).

Aging Around the World

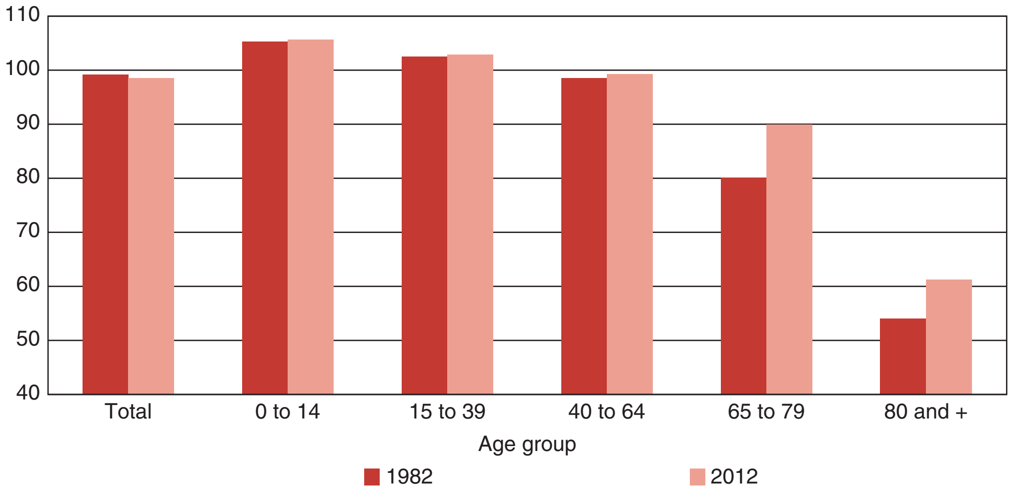
Data from around the world confirm the picture of an increasingly older population throughout the 21st century. In 2015, there were 617 million people worldwide over the age of 65, 8.5 percent of the total population. Predictions suggest that this number will triple to 1.57 billion by the year 2050. As shown in Figure 1.11, in 2015, Asia had the highest number of people 65 years of age and older (55 percent) and Africa the lowest (7 percent; He et al., 2016).

The population worldwide is aging at disproportionate rates from region to region. Figure 1.11 shows the distribution of percentage increases according to world region from 2015 to 2050 (He et al., 2016). The greatest increases will occur in Asia and Africa, and the greatest decrease will be in Europe. In 2015, the oldest country in the world (with the highest percentages of 65 and older) was Japan, and the youngest was Puerto Rico. It is projected that Japan will remain the oldest country in 2050 and that Serbia will be the youngest.

The aging of the world's population will disproportionately occur in the 80-and-older age group. Worldwide, those aged 80 years and older will increase from 126 million in 2015 to 447 million by 2050, with Asia showing particularly rapid growth in this segment of the population. Between 2015 and 2050, 23 countries in Asia will experience a quadrupling of the 80-year-old population and older compared to only one European country, Bosnia and Herzegovina. The larger proportion of the aging population in the world will place a strain

FIGURE 1.10

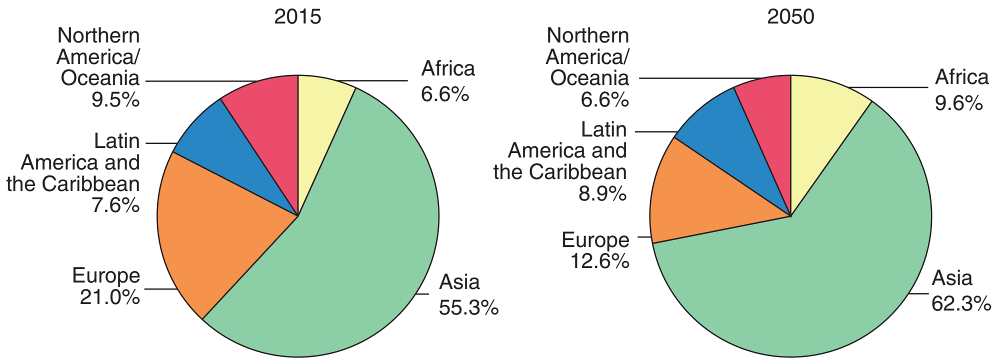
Sex Ratio by Age Group: Number of Males for 100 Females, 1999 and 2019, Canada



Source: From Statistics Canada (2019a). Annual demographic estimates: Canada, provinces and territories. Retrieved from www150.statcan.gc.ca/n1/pub/91-215-x/91-215-x2019001-eng.pdf

FIGURE 1.11

Distribution of World Population Aged 65 or Over by Region, 2015 to 2050



Source: From He, W., Goodkind, D., & Kowal, P. (2016). International Population Reports, P95/16-1, *An Aging World: 2015*. U.S. Government Publishing Office: Washington D.C. Retrieved from https://www.census.gov/content/dam/Census/library/publications/2016/demo/p95-16-1.pdf

on the economies and health care systems of all nations but particularly those that lack the resources to support the rise in the older adult population, particularly those in low-income countries (He et al., 2016).

What are the implications of these figures for your future as you enter into and move through your adult years? First, you will likely have more friends and associates than the current older population does, simply because there will be more peers in your age group to socialize with. If you are male, the news is encouraging: you will be more likely to live into old age than the current cohorts of older adults. For those of you who are younger than the baby boomers, the statistics are also encouraging if you are considering a career related to the field of aging, given the higher number of older clientele. Changes in various aspects of lifestyle can also be expected in the next decades, as adjustments to the aging population in the entertainment world and media are made. Just as society is getting used to the idea of an aging Paul McCartney, many others will follow in his footsteps to change views about prominent celebrities in Western society and, indeed, around the world.

Aging Resources in the Canadian Context

Canada is an exciting place to be if you are interested in gerontology. Canadian gerontology and research centres are located across Canada, and many of these can be found listed on the Canadian Institute of Health Research (CIHR) Institute of Aging (IA) website. Research priorities in the field of aging are determined by the CIHR and its Institute of Aging (IA). The mandate of the IA is to "support research, to promote healthy aging and to address causes, prevention, screening, diagnosis, treatment, support systems, and palliation for a wide range of conditions associated with aging." One of the major strategic initiatives is the Canadian Longitudinal Study on Aging. Launched in 2009, this project involves more than 200 researchers from 26 Canadian universities. The goal is to assess about 50,000 Canadian men and women between the ages of 45 and 85 every 3 years for at least 20 years, providing one of the most comprehensive databases on aging in the world. Multiple aspects of aging are being investigated, including biological, medical, psychological, social, lifestyle, and economic aspects of people's lives. The goal is to better understand how these factors, individually and in combination, influence health, disease, and disability as Canadians grow older.

Other gerontology organizations in Canada include the Canadian Association of Gerontology, the Canadian Geriatrics Society, the Canadian Gerontological Nurses Association, the National Initiative for the Care of the Elderly, and the Canadian Coalition for Seniors' Mental Health. In addition, there are provincial gerontology organizations and organizations devoted to specific groups, such as the Canadian Caregiver Coalition and the Alzheimer Society of Canada. Together, these organizations are working to support older adults and their family members through research, education, advocacy, and the development of policies and practices to ensure a good quality of life for all older adults in Canada.

SUMMARY

1. This book uses the biopsychosocial perspective, which regards development as a complex interaction of biological, psychological, and social processes. The four principles of adult development and aging include the assumptions that changes are continuous over the life span; only the survivors grow old; individual differences are important to recognize; and "normal" aging is different from disease. Distinctions must be drawn between primary aging (changes that are intrinsic to the aging process) and secondary aging (changes due to disease).
2. It is difficult to define the term "adult," given the range of possible criteria. For the purposes of this book, we will consider the ages of 18 to 22 to serve as a rough guideline. The over-65 population is generally divided into the

subcategories of young-old (65 to 74), old-old (75 to 84), and oldest-old (85 and over). Centenarians include individuals 100 and older, and supercentenarians are those 110 and older. These divisions have important policy implications and highlight the need to make distinctions among individuals over 65.

3. The idea of functional age bases age on performance rather than chronological age. Additionally, biological, psychological, and social age all provide alternative perspectives to describe an individual. While personal aging refers to changes within the individual over time, social aging refers to the effects of exposure to a changing environment and includes normative age-graded influences, normative history-graded influences, and non-normative influences.
4. Social factors important to the study of adult development and aging include gender, ethnicity, socioeconomic status, and religion.
5. The baby boom generation has had and will continue to have a great impact on Canadian society. Currently, 17.5 percent of the total Canadian population are age 65 and older and it is estimated that will increase (Statistics Canada, 2019a). Gender and ethnic variations are also expected to change. Countries around the world will show increases in the 65 and over population as well, particularly in Asia and Africa. These changes will impact the way in which you view your own later adulthood as well as prepare for what will happen in your later years.

2

Models of Development: Nature and Nurture in Adulthood

We're sure you are familiar with plenty of stereotypes about aging. Some positive, some negative, and many of them contradictory. From driving to intelligence, here are some common ones. Which do you agree with? Check your answers on the next page.

AGEFEED

test yourself

1. Older adults are bad drivers.
2. In later life, people lose all interest in sex.
3. Older adults are cute.
4. Grumpiness is common in older adults.
5. Older adults are warm and kind.
6. All older adults are senile.
7. The older you get, the wiser you become.
8. Older adults are wrinkly and saggy.
9. Nothing excites older adults more than the early bird special.
10. Older adults are helpless with technology.

AGEFEED
...the scores

All of the statements were stereotypes, representing different forms of ageism. Here's what your scores might suggest about your own attitudes towards aging:

1–3: You hold some negative views about older adults, but for the most part you have managed to avoid too many stereotypes. Even if you agreed with ''positive'' statements, these still represent overgeneralizations.

4–5: Your views about older adults reflect some of the typical stereotypes but you still hold some non-stereotyped views.

6–8: Almost all of your views about older adults represent common stereotypes. Keep an open mind to what you'll learn in this text to counteract those views!

9–10: You definitely have room for improvement in your understanding of older adults. We hope this text will educate you otherwise!

The study of adult development and aging has evolved from the field of developmental psychology to incorporate the years beyond childhood and adolescence into a unified view of the life span. For many years, the field of developmental psychology was synonymous with the field of child development. Starting in the 1960s, several influential theorists determined that the emphasis in the field should extend through the entire life span. They argued that designating a point when people stopped developing did not make sense because people do not stop growing and changing once they reach full maturity. Although there are still theorists and researchers in developmental psychology who retain an emphasis on the early years, the emphasis in the field is increasingly coming to embrace the middle and later years of life.

Reflecting the expanded view of developmental psychology beyond the early years of life, the term **developmental science** emerged in the 1960s to promote a more integrative, life-span view of individual growth and change (Magnusson, 1996). The use of the term "science" rather than "psychology" additionally conveys a shift from focusing solely on what happens to the individual over time to understanding the systematic effects of multiple influences that all play a role in the developmental process.

Developmental scientists look, then, at the multiple intersecting factors that impact change. According to this approach, to understand development, we have to go beyond the unit of the individual and look at social context. **Contextual influences on development** include sex, ethnicity, social class, income, religion, and culture.

Another key feature of developmental science is that it goes beyond psychological domains such as cognition and personality and instead examines areas of functioning traditionally used in other disciplines relevant to behaviour such as biology, health, and sociology. The inclusion of social context implies that it is not sufficient to look only within the individual's immediate environment in order to understand change over time (Ford & Lerner, 1992). Particularly important to the field of developmental science is a desire to understand the dynamic interactions among and within each level of analysis of change, from the biological to the social (Lerner, 1996).

With the refocus towards developmental science, researchers now attempt to explain the underlying processes of development rather than simply use a descriptive approach to catalogue the changes over time that occur as people get older. The descriptive approach to development was practiced for many decades as scholars attempted to establish the ages at which particular events occur within the individual. Developmental scientists are now attempting to discover orderly principles underlying growth through life: the "whys," not just the "whats."

Developmental science is also increasingly relying on advances in the field of neuroscience, or the study of brain-behaviour relationships. Researchers in developmental neuroscience use brain scanning methods to correlate changes in the structures of the nervous system with changes in behaviour from birth through later life. They also draw from research on species other than humans in which experimental methods can be used to manipulate both genes and the environment in ways that are not possible with humans.

In summary, the emerging field of developmental science suggests that individuals continue to grow and change over the entire course of their lives. Additionally, developmental scientists believe that it is important to consider multiple influences, particularly the way in which social context influences change over time.

MODELS OF INDIVIDUAL–ENVIRONMENT INTERACTIONS

What causes people to change over time? We know that nature and nurture influence the individual's growth, but how much can we attribute to nature and how much to nurture? When you think about your own development, do you tend to say you must have your mother's this or your father's that? Or do you connect your current behaviours with the city or town you grew up in, what your friends were like, and where you went to school? Questions such as these fall into the category of individual–environment interactions in development. Just as you think about the causes of your own behaviour, so do developmental scientists.

Early in the 20th century, developmental psychologists took a largely "nature" approach. They regarded growth in childhood as a clocklike process that reflected the unfolding of the individual's genetic makeup. This was the assumption of early 20th-century writers such as Arnold Gesell (1880–1961), who took on the task of chronicling a child's changes from birth to adolescence. According to these early developmental theorists, such changes reflected the influence of ontogenesis, or maturational processes, as they unfolded within the child. Early scholars such as Gesell gave minimal emphasis to the environment. They believed that parents needed to provide the right growing conditions, much as you would provide water and light to a plant seedling. Other than that, the child's genes would dictate the pace and outcome of development.

Challenging the nature position was the founder of American behaviourism, John B. Watson (1878–1958). Writing some 20 years after Gesell, Watson took the extreme "nurture" position that a child's development was entirely dependent on the environment the parents provided. Similarly, the behaviourist B. F. Skinner (1904–1990) believed that development consisted of the acquisition of a series of increasingly complex habits reflecting the child's exposure to new experiences.

The nature–nurture debate stimulated many of the classic studies in child development. Researchers from the opposing viewpoints attempted to prove their positions by contrasting, for example, differences between identical twins reared together and those reared in separate homes. The theory behind these studies was that since identical twins shared 100 percent of their genetic material, any differences between those reared apart would be due to the environment in which they grew up.

Perhaps the most hotly debated of these discussions was the issue of whether intelligence is inherited or acquired.

RoboMichalec/Pixabay

The young soccer players shown here have found their "niche" in athletics, in which they continue to develop their interests and abilities.

The debates took on a different tone as researchers understood more and more that neither influence alone could account for individual differences in performance on intelligence tests—in children or adults. One contribution that changed the tone of the nature–nurture debate occurred when developmental psychologist Sandra Scarr introduced the concept of **niche-picking** (Scarr & McCartney, 1983), the proposal that genetic and environmental factors work together to influence the direction of a child's life. According to this concept, children quite literally pick out their "niche," or area in which they develop their talents and abilities. Once they start down that particular pathway, they experience further changes that influence the later development of those particular abilities.

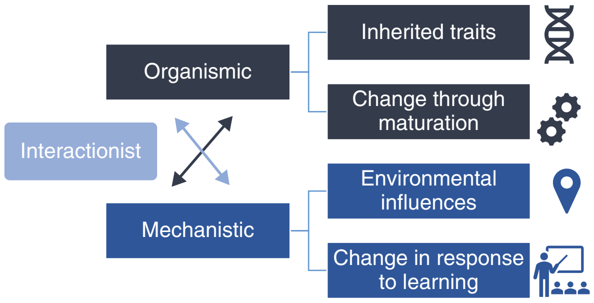
Consider the example of a child whose genetic potential predisposes her to be a talented dancer. She has a great deal of flexibility, poise, and a good sense of rhythm—all characteristics that reflect strong "dance" genes. At the age of 4, her parents take her to a ballet performance. She sits glued to her seat, fascinated by the pirouetting and leaping of the performers who she sees on stage. This event triggers pleas to her parents to enroll her in ballet lessons, and soon they do. The child has chosen dancing as her "niche," having been exposed to the ballet performance, and once allowed to pursue her talent, she continues to thrive. Thus, her "dance genes" lead her to develop an interest in exactly the activity that will allow her talents to flourish. Similarly, had she possessed strong athletic abilities, she would have pursued a game such as soccer or field hockey that, in turn, would have given her the niche in which to develop those strengths.

There are three prominent models in developmental science; each gives differing emphasis to genetics, the environment, and the interaction of the two (Lerner, 1995). Figure 2.1 illustrates these models.

According to the **organismic model** (taken from the term "organism"), heredity drives the course of development throughout life. Changes over time occur because the individual is programmed to exhibit certain behaviours at certain ages in a stage- or step-wise fashion. Thus, development reflects primarily the influence of maturational forces arising within the individual due to genetic programming.

FIGURE 2.1

Models of Development



Organismic models regard development as reflecting inherited traits that change through maturation. Mechanistic models propose that environment and learning are the main forces in development. Interactionist models view development as reflecting interactive processes between the two.

In contrast, the **mechanistic model** of development (taken from the word "machine") proposes that people's behaviour changes gradually over time, shaped by the outside forces that cause them to adapt to their environments. Developmental scientists working from the mechanistic model propose that growth throughout life occurs by exposure to experiences that present new learning opportunities. Because this exposure is gradual, the model assumes that there are no clear-cut or identifiable stages. Instead, development is a smooth, continuous set of gradations as the individual acquires new experiences.

The **interactionist model** takes the view that not only do genetics and environment interact in complex ways to produce their effects on the individual but that individuals actively shape their own development. This model is most similar to niche-picking because it proposes that you can be shaped by and, in turn, shape your own environments.

With increasing evidence from studies showing that genetics and environmental influences on development in fact interact with one another, the interactionist model perhaps has the most empirical support. The nature–nurture controversy ultimately appears to boil down to "nature *and* nurture," and further, that each influences the other in a continuous fashion throughout life.

A related concept is also becoming increasingly accepted: that individuals can alter not only the nature of their interactions with the environment but also the rate and direction of the changes associated with the aging process. According to the principle of **plasticity in development**, the course of development may be altered (is "plastic"), depending on the nature of the individual's specific interactions in the environment. The type of interactions most likely to foster plasticity involve active interventions such as mental and physical exercise. Other ways to promote plasticity include taking steps to prevent causing harm to the body and mind by avoiding, as much as possible, engaging in risky behaviours. The biopsychosocial perspective falls within the interactionist model of development because it considers multiple influences on development and views the individual as an active contributor to change throughout life.

We have already discussed the need to examine the aging process from a multidimensional point of view and along with this notion is the idea that development can proceed in multiple dimensions across life. The concept of plasticity fits very well with the notion of compensation and modifiability of the aging process through actions taken by the individual, a concept that we will continue to explore throughout this book. From our point of view, the interactionist model provides an excellent backdrop for the biopsychosocial perspective and a basis for viewing the processes of development in later life on a continuum with developmental processes in the early years.

Reciprocity in Development

You can see that an important assumption of the interactionist model is that individuals are shaped in part by their experiences. Additionally, this model implies that individuals also shape their own experiences, both through active interpretation of the events that happen to them and through the actions they take. We would like to explore this idea now because it is so fundamental to the principles we articulate throughout the text.

The concept of **reciprocity in development** states that people both influence and are influenced by the events in their lives (Bronfenbrenner & Ceci, 1994). This model, then, explicitly proposes that not only are you shaped by your experiences but that you in turn shape many of the experiences that affect you.

Consider the reciprocal process as it has affected your own life. Earlier events in your life influenced you to choose a particular course that has brought you to where you are right now. Perhaps you and your best friend from high school decided to apply to the same university, and as a result you are at this university and not another one. Perhaps you chose this university because you knew you wanted to major in psychology and you were impressed by the reputation of the faculty in your department. Or perhaps your choice seemed to be made randomly, and you are unsure of what exactly led to your being in this place at this time even though there must have been something that led you to where you are now. In any case, you are where you are, having been influenced one way or another by your prior life events. That is one piece of the reciprocal process.

The second piece of the reciprocity puzzle relates to the effect you have on your environment; this, in turn, will affect subsequent events in your life. For example, by virtue of your existence, you affect the people who know you, your "life footprint," as it were. It is not only very possible but very likely that their lives may have already been altered by their relationship with you.

Indeed, your impact as a student at your university may have a lasting effect on both you and your institution. Everyone knows of great student athletes, scholars, or musicians who bring renown to their institutions. Even if you don't become a famous alum, your contributions to the school may alter it nevertheless. Have you ever asked a question in class that may have taken your professor by surprise? Perhaps, as a result, you may have permanently altered the way that professor approaches the problem in the future. It is not improbable to imagine that your question stimulates your professor to investigate a new research question. The investigation may ultimately produce new knowledge in the field, changing it permanently by virtue of your own, perhaps unwitting, contribution.

Though you may not become the source of groundbreaking research by one of your professors, you may nevertheless influence the people around you in much smaller ways that lead to important changes. Some of these influences may be good ones, as when you express kindness to a stranger who in turn has reason to smile, and for that instant, feels a bit better about the world. Others may prove disastrous, as when a single wrong turn while you are behind the wheel has the unfortunate effect of causing an accident that injures your passengers or those in other vehicles. In a split second, any person can influence others for better or worse, forever changing the course of someone's life.

To sum up, the reciprocal process takes as a basic assumption the idea that people are not passive recipients of environmental effects nor of their own heredity. Instead, choices and behaviours that each and every one of us makes leave a mark on the world. Subsequently, the changes in that environment may further alter people in significant ways, which leads to further impacts on society. Reciprocal views of development regard these continuing processes as both ongoing and, to some extent, unpredictable.

SOCIOCULTURAL MODELS OF DEVELOPMENT

The models of development we have just examined set the stage for looking in greater depth at particular theoretical approaches to adult development and aging. We begin by focusing on those approaches that give relatively more emphasis to the environment as an influence on development.

Ecological Perspective

The **ecological perspective**, proposed by pioneering developmental scientist Urie Bronfenbrenner (1994), identifies multiple levels of the environment as they affect the individual over time. As shown in Figure 2.2, the ecological perspective defines five levels of the environment or "systems," all of which interact in their influence on the individual. You are aware of some of these influences, but the further you go out from the centre, the less likely you are to have direct experiences with those systems (Swick & Williams, 2006).

Rather than see these as static circles, imagine them as having the ability to interact fluidly and in multiple directions. The individual is shown here at the centre. In keeping with the reciprocity principle, though, keep in mind that you are affected by the outer rings but can also have influence on each of them, to varying degrees. Closest to the individual is the **microsystem**, the setting in which people have their daily interactions and which therefore have the most direct impact on their lives. The **mesosystem** is the realm of the environment in which

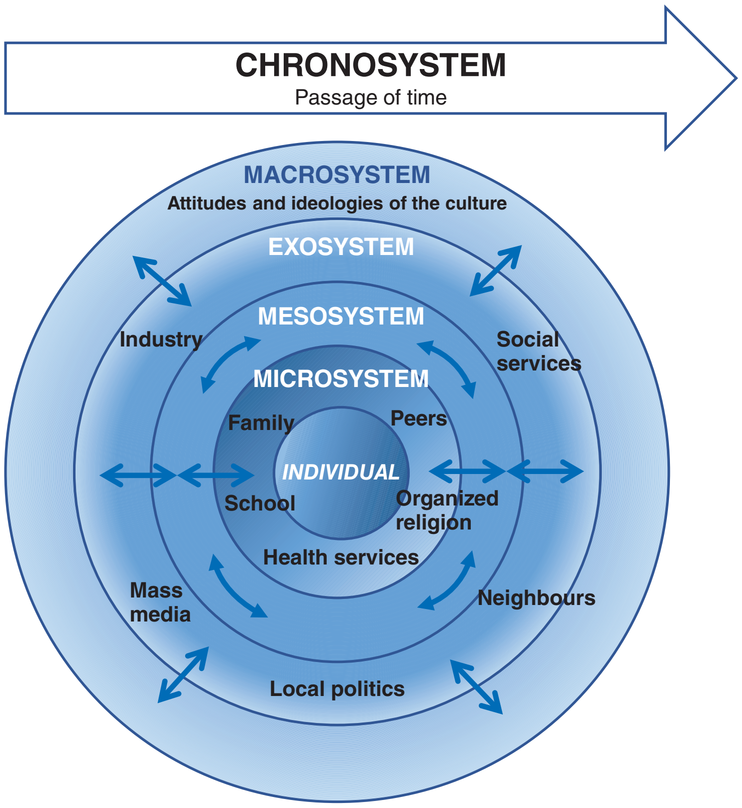


FIGURE 2.2

Bronfenbrenner's Ecological Perspective

The ecological model of development proposes that development occurs over time (the "chronosystem") within the individual, who is at the centre of the systems reflecting environmental influences.

interactions take place among two or more microsystems. For example, you may be having difficulties at home that you carry over into your relationships with co-workers. The **exosystem** includes the environments that people do not closely experience on a regular basis but that impact them nevertheless. These environments include such institutions as the workplace and community centres as well as extended family, whom you may not see very often. The **macrosystem** includes the larger social institutions ranging from a country's economy to its laws and social norms. The macrosystem influences the individual indirectly through the exosystem.

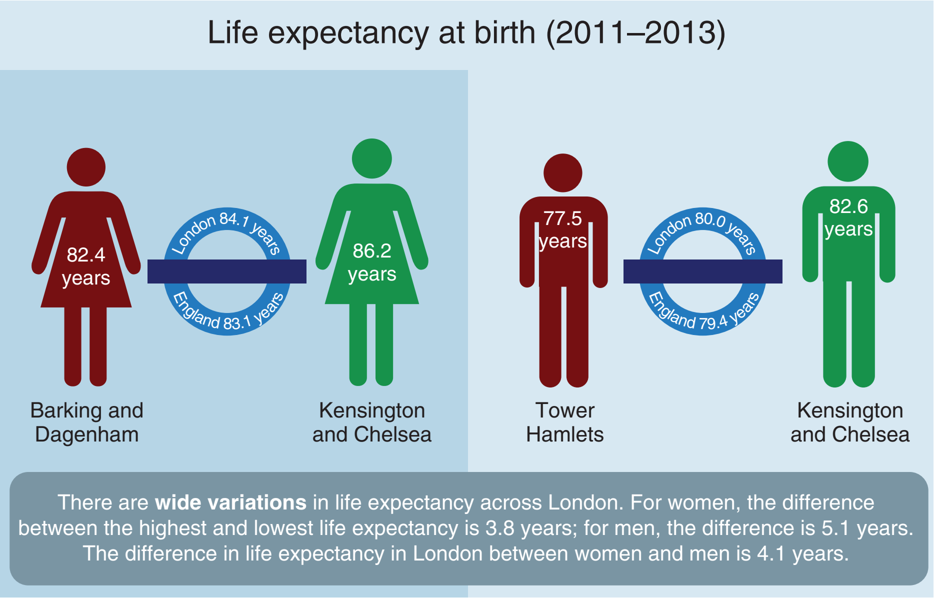
All of these systems interact over time. The **chronosystem** refers to the changes that take place over time. The interacting systems within the ecological model are affected by historical changes. These can include events within the family, for example, as well as events in the larger society that indirectly affect the individual by affecting the macrosystem.

Now that you have seen the different levels of the ecological model, you can experiment in your mind with ways that they interact. Consider a situation perhaps close to your own right now. Many university students in the United States, at least as of 2020, are forced to take out student loans. They graduate with significant debt, affecting their well-being for years to come. If the government either provided more funding for higher education, or at least debt service relief, students would not be burdened with so much debt.

You could, alternatively, influence the outer ring of the ecological system by speaking out against student debt. You could organize a movement on your campus to lobby for student loan forgiveness. Perhaps you are able to bend the ear of a legislator who, in turn, proposes new laws that lead to student debt relief. Individuals who bring about broad social changes exemplify how reciprocity can work at all levels. On a smaller scale, however, as we showed before, you can also influence those around you in more direct and immediate ways.

The ecological model can also apply to such areas as health. Although you may typically think of your overall health as functioning within your inner biological level, researchers working within the Whitehall II study have demonstrated the significance of relations with others on health. In one study, participants who reported negative characteristics of close relationships had a higher likelihood of being overweight (Kouvonen et al., 2011). Social support from a relationship identified as the closest related to physical activity, even after controlling for factors such as physical functioning and self-rated health.

Other studies from Whitehall II show that, even more surprisingly, the location in which people live can shorten their life expectancy. In one study, researchers mapped life expectancy in the city of London, England, according to the underground (Tube) station nearest to their home. Even across only a 13 km distance, life expectancy varies dramatically, ranging from as high as 97 years or older near the affluent areas of central London to 75 years in the poorer sections of the city. The estimates are that a year of life expectancy is lost for each station moving eastbound to the lower-income areas of the London Tube (Cheshire, 2012).



There are **wide variations** in life expectancy across London. For women, the difference between the highest and lowest life expectancy is 3.8 years; for men, the difference is 5.1 years. The difference in life expectancy in London between women and men is 4.1 years.

FIGURE 2.3

Life Expectancy at Birth in London

Reinforcing Bronfenbrenner's ecological model, a study of life expectancy according to wealth within London, England, shows how men and women living in the wealthy areas of Kensington and Chelsea outlive those living in the poorer districts along the London Underground of Barking/Dagenham and Tower Hamlets.

S. Hermann & F. Richter/Pixabay

For many people, the social clock can create stress as they measure their progress towards achieving goals associated with age norms.

Figure 2.3 depicts these disparities in the comparison between the wealthier Kensington and Chelsea districts and the regions of Barking and Dagenham, which represent the poorer neighbourhoods in East London (Cheshire, 2012).

The Life Course Perspective

The ecological model's emphasis on social context provides an excellent background for understanding a concept central to social gerontology. According to the **life course perspective**, norms, roles, and attitudes about age have an impact on the shape of each person's life (Settersten, 2006). It's important to recognize, right at the start, that the term life "course" is not the same as life span. The life "course" refers, literally, to the course or progression of a person's life events. This course is theorized to be heavily shaped by society's views of what is appropriate and expected to occur in connection with particular ages.

Within the life course perspective, specific theories attempt to link society's structures to the adaptation, satisfaction, and well-being of the people who live in that society. Social gerontology focuses on age as the primary structure that influences an individual's quality of adaptation. Social class, family roles, and work are additional areas of study by gerontologists studying the life course.

Related to the concept of the life course is the **social clock**, the expectations for the ages at which a society associates with major life events (Hagestad & Neugarten, 1985). These expectations set the pace for how people think they should progress through their family and work timelines. People evaluate themselves according to these expectations, deciding whether they are "on-time" or "off-time" with regard to the social clock. Those who see themselves as off-time may feel that they've failed, especially when they are criticized by others who expect people to follow the normative prescriptions for their age group. In this sense, the "non-events" of life, those that don't happen but are believed to be normative, may have as much of an influence on an individual's life as actual events.

Increasingly, however, individuals are setting their own unique social clocks with one of the most famous being former astronaut and Ohio senator John Glenn (1921–2016). At the age of 77, Glenn joined the space shuttle *Discovery* crew on a 9-day orbital mission in 1998. His ability to meet the arduous physical requirements of the voyage was aptly captured in his statement: "Too many people, when they get old, think that they have to live by the calendar." More recently, actress Betty White (born in 1922), challenged the views that older women need to be staid and serious with her performances in comedic roles on television and in the movies.

Not only is age linked to the social clock, but also to people's social roles, the resources available to them, and the way they are treated by those with whom they interact. One of the guiding frameworks regarding age and role satisfaction

Budimir Jevtic/Shutterstock.com

Treating older adults as if they lack technological skills is one example of ageism, as shown by this young woman who is placing pressure on this older adult.

is **activity theory**, the view that older adults are most satisfied if they are able to remain involved in their social roles (Cavan et al., 1949). If forced to give up their roles, according to this view they will lose a major source of identity as well as their social connections. According to activity theory, older adults should be given as many opportunities as possible to be engaged in their work, families, and community.

A contrasting perspective to activity theory is **disengagement theory** (Cumming & Henry, 1961), which proposed that the normal and natural evolution of life causes older adults to loosen purposefully their social ties. This natural detachment, according to disengagement theory, is not only inevitable but also desirable. Aging, furthermore, is accompanied by a mutual withdrawal process of the individual and society that is sought after, and favourable to, the older person. It follows from disengagement theory that retirement and isolation from family members are sought out by older adults and result in higher levels of well-being.

When first proposed in the early 1960s, gerontologists were highly skeptical if not outraged by the propositions of disengagement theory. The idea that older adults wanted to be put "on the shelf" and could even benefit from social isolation only reinforced negative treatment of older adults by society. Rather than describing a desirable end product of a mutual withdrawal process, critics of disengagement theory regarded it as disrespectful of older adults and as a justification for what is already harsh treatment by society of its older adult members, as you will learn more about in the next section.

Yet, it makes sense that not all older adults wish to be as active and involved in their work, family, and community as they were when they were younger. **Continuity theory** (Atchley, 1989) proposes that whether disengagement or activity is beneficial to the older adult depends on the individual's personality. Some older adults prefer to withdraw from active involvement with their families and communities; others are miserable unless they are in the thick of the action. Either forced retirement or forced activity will cause poorer adjustment and self-esteem in middle-aged and older adults than finding the amount of involvement that is "just right."

Ageism as a Social Factor in the Aging Process

The social context in which aging occurs is, unfortunately, one that is not necessarily favourable to the overall well-being of older adults. Many are affected by **ageism**, a set of beliefs, attitudes, social institutions, and acts that denigrate individuals or groups based on their chronological age. Similar to other "isms" such as racism and sexism, ageism occurs when an individual is assumed to possess a set of stereotyped traits.

Ageism can apply to anyone, regardless of age. Teenagers are often stereotyped as lazy, impulsive, rebellious, and self-centred. However, for all practical purposes, ageism is used to refer to stereotyped views of the *older adult* population. Disengagement theory was thought of by its critics as a justification for ageism, as a way to move older people conveniently, and with justification, to the backdrop of society. Moreover, by implying that all older adults have the same drive to withdraw, the theory perpetuates the stereotype that all older adults have similar personalities.

The primarily negative feature of ageism is that, like other stereotypes, it is founded on overgeneralizations about individuals based on a set of characteristics that have negative social meaning. Ageism applies to any view of older adults as having a set of characteristics, good or bad, that are the same for everyone. Even though ageism may have a positive spin (Kite & Wagner, 2002), its overall thrust is negative. Calling an older adult "cute" or "with it" is as much an expression of ageism as is referring to that person as "cranky" or "senile."

One effect of ageism is to cause younger people to avoid close proximity to an older person. In fact, ageism may also take the form of not being openly hostile but of making older adults "invisible": that is, not worthy of any attention at all. Ageism is often experienced in the workplace, and although prohibited by law (a topic explored in Chapter 10), older workers are penalized for making mistakes that would not incur the same consequence if made by younger workers (Rupp et al., 2006).

Ironically, aging is the one stereotype that, if you are fortunate enough to survive to old age, you will most likely experience. Unlike the other "isms," people who hold aging stereotypes will eventually become the target of their own negative beliefs as they grow old. What are your stereotypes about aging? Research on university students shows that the ones most likely to harbour ageist attitudes are those who identify most strongly with their own age group (Packer & Chasteen, 2006). In other words, the more likely you are to think of yourself as a teen or twenty-something, the more likely you'll hold biased views of older adults. As a result of taking this course, however, we hope you will gain knowledge that will cause you to challenge your own stereotypes about aging and older adults.

Ageism takes many forms, and its effects can be significant, both on older adults and on society at large. Figure 2.4 summarizes the facts that counter the most common misconceptions about aging and presents the policy implications were each fact to be heeded by world leaders and policy makers (World Health Organization, 2018c). For example, the fact that availability of resources influences diversity in older adults, as shown in the London Tube study, suggests that policies should be aimed at reducing inequity, allowing more older adults to experience healthy aging.

Why does ageism exist? Of the many possible causes, perhaps at the root is that older adults remind us of the inevitability of our own mortality (Greenberg et al., 2017). According to **terror management theory**, people regard with panic and dread the thought that their lives will someday come to an end (Darrell & Pyszczynski, 2016). They engage in defensive mechanisms to protect themselves from the anxiety and threats to self-esteem that this awareness produces. Younger people therefore unconsciously wish to distance themselves as much as possible from older adults. Having acquired ageist attitudes when younger, older adults themselves may start to view themselves and their own opportunities for the future in a more limited manner (Barber & Tan, 2018).

An alternative perspective, advanced by sociologists, is that older adults are seen negatively because they have lost their utility to society. According to the **modernization hypothesis**, the increasing urbanization and industrialization of Western society is what causes older adults to be devalued (Cowgill & Holmes, 1972). They can no longer produce, so they become irrelevant and even a drain on the younger population.

Current views of modernization as an explanation of ageism criticize the theory as being overly simplistic. Instead of considering the extent to which a country has become modernized as the only factor affecting the status of older adults, it is necessary to take employment status into account. When older adults are employed at higher rates, their social status even in modernized countries is viewed more favourably (Vauclair et al., 2015).

Whatever its cause, older adults must nevertheless cope with ageist attitudes. Many too must cope with other "isms" that affect the way they are regarded in society. According to the notion of **intersectionality**, multiple "isms" such as ageism, sexism, and racism do not just add up but interact with one another to influence the discriminatory ways in which people reflecting more than one group are treated. The **multiple jeopardy hypothesis** (Ferraro & Farmer, 1996) states that older individuals who fit more than one discriminated-against category are affected by biases against each of these categorizations. Women are subject to ageism and sexism, and minority-status women are subject to racism, ageism, and sexism. Regardless of minority status, women may also experience "lookism," in which older women (but not men) are judged as less attractive on the basis of looking older. They may also be treated differently as consumers based on their age and sex. One study of retail sales employees revealed that 95 percent of female and 54 percent of male attendants gave preferential treatment to well-dressed, young female customers (Palmeira, 2014). Thus, classism (biases against people of working-class backgrounds) further adds to multiple jeopardy. These systematic biases interact with age to produce greater risk for discrimination in attitudes and the provision of services to specific subgroups of older adults.

It's possible, however, that older adults are somehow protected from multiple jeopardy. The **age-as-leveller view** proposes that as people become older, age overrides all other "isms." Older adults, whatever their prior status in life was, all become victims of the same stereotypes. Regardless of minority status, gender, or other social characteristics, all older adults are viewed with the same harshly negative views. Consider the case of a wealthy older adult white male and an older lower-income minority woman. Though the man almost certainly would have enjoyed many advantages over the woman when he was younger, the age-as-leveller view proposes they are now seen as having an equally low social ranking because they are old. Therefore, there's only a single jeopardy of ageism facing older adults rather than multiple jeopardy resulting from a combination of "isms."

Older adults potentially facing multiple jeopardy may also be protected from its effects and even perhaps fare better than those with higher social standing. According to the **inoculation hypothesis**, older minorities and women have managed to become immune to the effects of ageism through years of exposure to discrimination and stereotyping. These years of maltreatment help them to develop a tolerance, so that they are better able to withstand the negative attitudes applied to older adults than are their counterparts. The upper-income white male may actually find it more difficult to accept the stereotypes of ageism than does the low-income minority woman, who is used to being treated as a less desirable member of society after years of discrimination. Even so, his privileged status may have granted him more economic resources from which to draw, which in turn could buffer him from this newly acquired lower status by virtue of his age.

These perspectives of ageism become important in examining the health and well-being of older adults. Interestingly, neither ageism nor multiple jeopardy appears to have deleterious effects on feelings of happiness and well-being, a topic we explore in Chapter 14. However, the effects of less access to

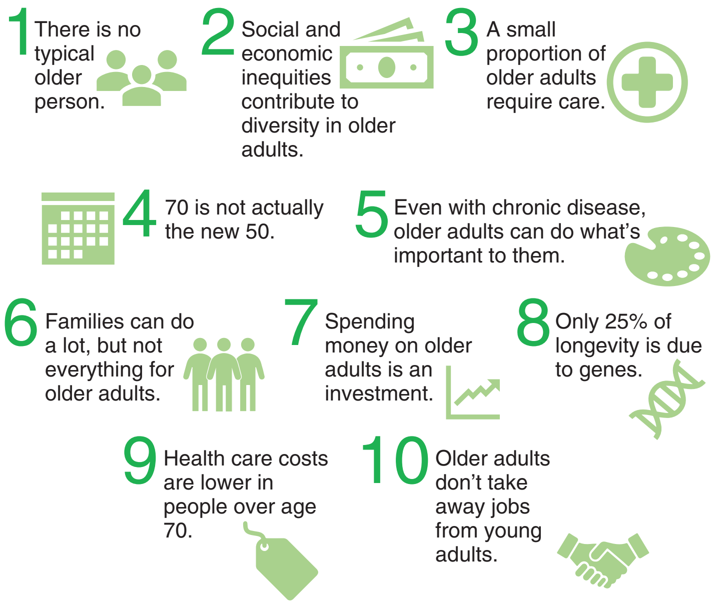

1 There is no typical older person.
2 Social and economic inequities contribute to diversity in older adults.
3 A small proportion of older adults require care.
4 70 is not actually the new 50.
5 Even with chronic disease, older adults can do what's important to them.
6 Families can do a lot, but not everything for older adults.
7 Spending money on older adults is an investment.
8 Only 25% of longevity is due to genes.
9 Health care costs are lower in people over age 70.
10 Older adults don't take away jobs from young adults.

FIGURE 2.4

10 Facts You Probably Didn't Know About Aging

Ageism can be countered with these 10 facts about aging.

health care and exposure to negative views of aging on those who are subjected to the "isms" may take their toll on physical health and are therefore a matter of vital concern.

PSYCHOLOGICAL MODELS OF DEVELOPMENT IN ADULTHOOD

In the broadest sense, psychological models attempt to explain the development of the "person" in the person–environment equation from the standpoint of how adaptive abilities unfold over the course of life. Psychologists approach aging by focusing on the changes that occur over time in the individual's self-understanding, ability to adjust to life's challenges, and perspective on the world.

Erikson's Psychosocial Theory

According to developmental psychologist Erik Erikson (1963), people pass through a series of eight stages as they progress from birth through death. A psychoanalyst by training, Erikson attempted to understand how people navigate the major psychological issues that they face when they encounter each of life's new challenges.

Erikson's **psychosocial theory of development** proposes that at certain points in life, biological, psychological, and social changes come together to influence the individual's personality. He defined each stage of development as a "crisis" or turning point that reflects the combination of these three sets of influences. The "crisis" is not truly a crisis in the sense of being a catastrophe or disaster. Instead, each psychosocial stage is a time during which the individual may move closer to either a positive or negative resolution of a particular psychosocial issue.

The easiest way to understand Erikson's theory is by examining an 8 × 8 matrix with the individual's approximate age along one dimension and the major psychosocial issue along the other. As shown in Figure 2.5, this creates eight points of intersection at which the individual's age meets a main issue. The typical course of development, according to Erikson, is to proceed along this upward diagonal. However, there can be exceptions, as we will note shortly.

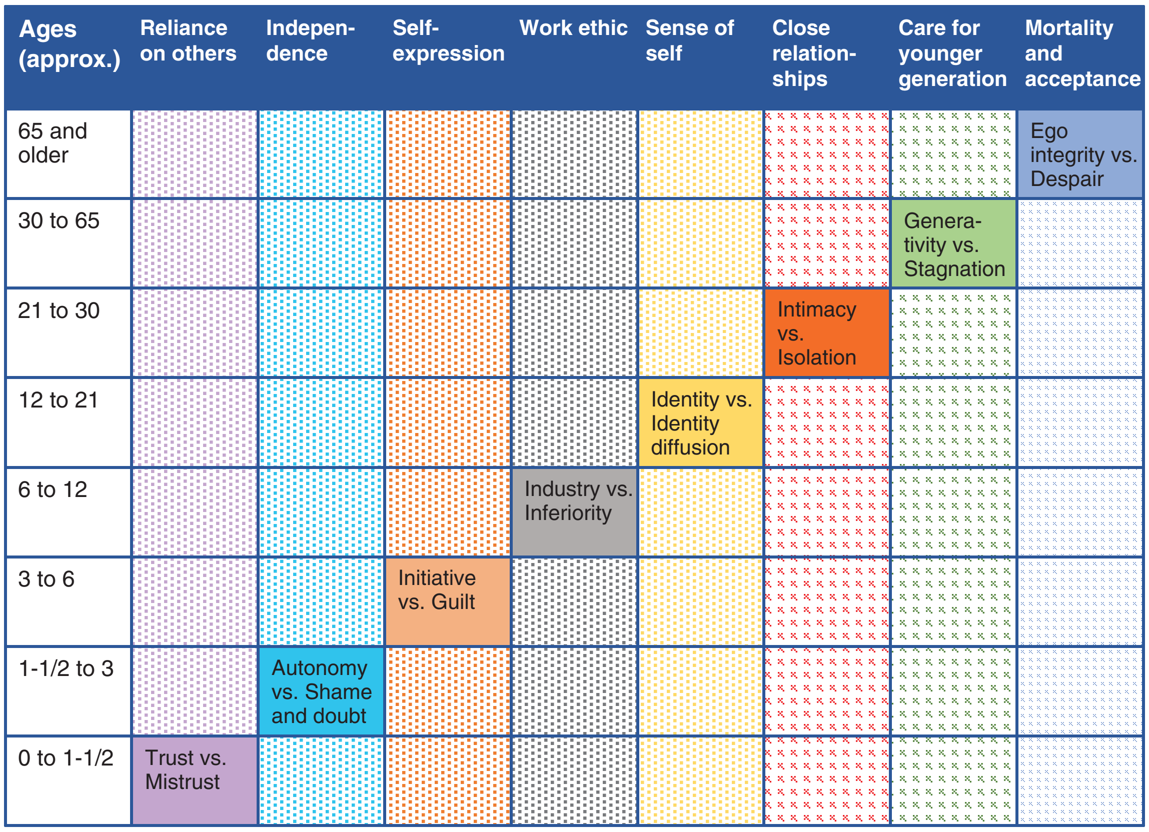
Erikson proposed the **epigenetic principle** to apply to the course of development, meaning that each stage along the diagonal unfolds from the previous stage in a predestined order. Biological processes of development account for the individual's maturation from infancy to later adulthood, and thus, the stages Erikson proposed, are built into the hard-wiring of the human being.

Turning now to the stages themselves, which are summarized in Figure 2.5, each represents the ratio of favourable to unfavourable resolution achieved by the individual at that particular point in life. The earliest four stages are central to the adult's ability to build a solid sense of self and engagement with others. **Basic trust versus basic mistrust** involves the infant's establishing a sense of being able to rely on care from the environment (and caregivers). In **autonomy versus shame and doubt**, young children learn ways to act independently from their parents without feeling afraid that they will venture too far off on their own. In the **initiative versus guilt** stage, the child becomes able to engage in creative self-expression without fear of making a mistake. The last stage associated with childhood, **industry versus inferiority**, involves the individual's identifying with the world of work and developing a work ethic.

The first of the eight stages directly relevant to adulthood is **identity achievement versus identity diffusion** (shown in Figure 2.5 as "identity vs. identity diffusion"), which is when individuals must decide "who" they are and what they wish to get out of life. This stage emerges in adolescence, yet continues to hold importance throughout adulthood, forming a cornerstone of subsequent adult psychosocial crises (Erikson et al., 1986;

FIGURE 2.5

Stages in Erikson's Psychosocial Theory



Ages (approx.)	Reliance on others	Independence	Self-expression	Work ethic	Sense of self	Close relationships	Care for younger generation	Mortality and acceptance
65 and older								Ego integrity vs. Despair
30 to 65							Generativity vs. Stagnation	
21 to 30						Intimacy vs. Isolation		
12 to 21					Identity vs. Identity diffusion			
6 to 12				Industry vs. Inferiority				
3 to 6			Initiative vs. Guilt					
1-1/2 to 3		Autonomy vs. Shame and doubt						
0 to 1-1/2	Trust vs. Mistrust							

Erikson's theory proposes that there are eight psychosocial issues (shown in the diagonal) that people confront over the life span. The top row of the chart shows these eight issues and the vertical axis illustrates the typical age at which each becomes prominent.

Whitbourne & Connolly, 1999). An individual who achieves a clear identity has a coherent sense of purpose regarding the future and a sense of continuity with the past. By contrast, identity diffusion involves a lack of direction, vagueness about life's purposes, and an unclear sense of self.

In the **intimacy versus isolation** stage, individuals are faced with making commitments to close relationships. Attaining intimacy involves establishing a mutually satisfying close relationship with another person to whom a lifelong commitment is made. We can think of the perfect intimate relationship as the intersection of two identities, not a total overlap because each partner preserves a sense of separateness. The state of isolation represents the other end of the spectrum, in which a person never achieves true mutuality with a life partner. Theoretically, isolation is more likely to develop in individuals who lack a strong identity because in a close relationship, each partner has to "give up" a piece of his or her identity.

The motive for caring for the next generation emerges from the resolution of the intimacy psychosocial crisis. During the stage of **generativity versus stagnation**, middle-aged adults focus on the psychosocial issues of procreation, productivity, and creativity. The most common pathway to generativity is through parenthood, an endeavour that involves direct care of the next generation. However, individuals who do not have children can nevertheless develop generativity through such activities as teaching, mentoring, or supervising younger people. A career that involves producing something of value that future generations can enjoy is another form of generativity. Conversely, not all parents demonstrate a strong sense of generativity with regard to their own children. They may focus instead on other young people or prefer to invest their emotional resources on their friends or romantic partners.

The main feature of generativity is that the individual feels and shows concern over what happens to the younger generation, along with a desire to make the world a better place for them. Stagnation, by contrast, occurs when the individual turns concern and energy inward or solely to others of one's own age group rather than to the next generation. A person who is high on the quality of stagnation lacks interest or may even go so far as to reject the younger generation. The next time you hear someone complaining about "Millennials" being unwilling to work hard and completely obsessed with themselves, you might consider this to be an example of that individual's own sense of stagnation.

Towards the end of adulthood, individuals face psychosocial issues related to aging and facing their mortality, the key issues

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Mentoring is one example of generativity in which a senior business executive provides a model for her younger employees.

in the stage of **ego integrity versus despair**. Older individuals who establish a strong sense of ego integrity can look back at their experiences with acceptance. Ego integrity also involves an ability to look at and accept the positive and negative attributes of one's life and self, even if it may be painful for people to acknowledge their past mistakes or personal flaws. This sense of acceptance of the past and present self allows the individual also to view mortality with the acceptance that life inevitably must end.

It may be difficult for a young person to imagine how a person who is happy with life could also be happy with, or at least not devastated by, the thought of death. According to Erikson, acceptance of the past and present helps people attain acceptance about being at the end of their lives. In contrast, despair is the outcome of the individual's realization that death is coming too soon to help him or her achieve major life goals or rectify mistakes. The individual in a state of despair feels discontent with life and is melancholic, perhaps to the point of despondency, at the thought of death.

Erikson presented an organized, cohesive view of the life span that is both elegant and deceptively simple. At first glance, it might appear that he viewed development as proceeding in a series of steps moving steadily from childhood to old age. The diagonal in the matrix of ages and psychosocial issues shows how each age period is associated with a crisis. However, the intersection of ages and psychosocial issues along the diagonal is not the only possibility for development. People may experience a psychosocial issue at an age other than the one shown where it crosses the diagonal. Thus, the issues characterizing each stage (such as trust versus mistrust for infancy) may coexist as relevant concerns throughout adulthood. Any stage may reach ascendancy in response to events that stimulate its reappearance.

Let's look at an example to show how these "off-diagonal" situations might occur. An 80-year-old woman walking on a city sidewalk is suddenly attacked, robbed of her purse, and left alive but physically injured and emotionally shaken. This incident may traumatize her for some time and in the process, she becomes fearful of leaving her home. In Eriksonian terms, she is reliving the issues of "trust" experienced in infancy and must regain the feeling of safety in her environment. The woman may also be left feeling vulnerable that with her increasing years, she appears to be an easy target for a person with criminal intent.

Another implication of the epigenetic matrix is that a crisis may be experienced before its "time." A 35-year-old woman diagnosed with breast cancer may be faced with issues relevant to mortality, precipitating her to contemplate the psychosocial issues that normally confront much older people. The crisis stages can be considered "critical periods" during which certain issues are most likely to be prominent, but they are not meant to be discrete steps that proceed from youth to old age.

Erikson's views about development were a radical departure from the personality theories prevalent in the mid-1900s, when childhood was given sole emphasis as a time of important change. By reenvisioning the life span, Erikson provided a new but enduring perspective that recognized development as a lifelong set of processes that help to mould and shape and reshape the individual.

Piaget's Cognitive-Developmental Theory

Just as Erikson crafted a new model of personality development throughout the life span, a Swiss psychologist by the name of Jean Piaget brought an entirely new perspective to bear on the process of cognitive development. Rather than being content simply with describing children's development, as his predecessors had done, Piaget tried to explain the processes underlying their growth of cognitive abilities. Stimulated in part by watching his own young children explore their environment while at play, Piaget hypothesized the existence of a set of underlying processes that allowed them eventually to achieve understanding and mastery of the physical world.

Piaget believed that development involves continuing growth of the individual's knowledge about the world through a set of opposing, complementary processes. These processes target what Piaget called **schemas**, the mental structures we use to understand the world. Children's schemas change and mature as they explore their environment—a process that, ideally, helps them to bring their schemas increasingly in tune with reality.

Through the process that Piaget called **assimilation**, people use their existing schemas as a way to understand the world around them. In this context, the term assimilation does not have its usual meaning, as when you say that a person has become assimilated to a new culture. Rather, in Piaget's model, assimilation has the opposite meaning: it refers to the situation in which individuals change their interpretation of reality to fit the schemas they already hold. Instead of changing themselves to fit the culture, they change their perception of the culture to fit their own way of understanding it.

When you change your schemas in response to new information about the world you are, in Piaget's terms, using the process of **accommodation**. This process is actually more like the way we commonly speak about cultural "assimilation." In Piaget's terms, when you change yourself in order to fit the larger culture that you're now a part of, you are engaging in accommodation: You are the one who is changing. Throughout development, people's schemas change and mature as a result of interactions with other people, objects in the environment, and, of course, education. Ideally, as schemas mature, they become closer and closer, where possible, to "reality," but even these views may shift as new "realities" emerge.

As an example of the continuous changes that people make in their schemas, consider what happens when you change your mind about your musical preferences. Perhaps you have always found classical music to be intensely boring. A friend invites you to a concert in the park, and, much to your surprise, you actually enjoyed the violinist's performance of a Mozart concerto. Your schema about music now becomes revised and you find yourself downloading other selections to add to your workout playlist. This process, summarized in Figure 2.6, shows how people change their ideas, knowledge, and preferences over time.

It's unfortunate that Piaget's terms mean the opposite of their use in common speech, especially the concept of assimilation. However, it might be easier to understand assimilation and accommodation in the Piagetian sense if you remember that Piaget was describing the process of schema development. You impose your schemas onto the world, making the world fit you, in assimilation. You change your schemas about the world, changing in response to knowledge from experiences, in accommodation. (If all else fails, think of the "s" in assimilation standing for "same," and the "c" in accommodation for "change.")

The processes of assimilation and accommodation occur continuously throughout development. Children are constantly exploring their worlds, changing their schemas as they accommodate them to fit the reality of their experiences. At certain points in childhood, according to Piaget, there are major shifts in children's understanding of their experiences. These correspond to the stages associated with early infancy (sensorimotor stage), preschool (preoperational period), middle childhood (concrete operations stage), and adolescence through adulthood (formal operations stage). Each stage represents a time of **equilibrium**, when assimilation and accommodation are perfectly balanced. The equilibrium achieved in formal operations is the most stable because it is when the individual is able to use the highest level of thought to understand and learn from experience. However, throughout life, people rely on all forms of thought, ranging from sensorimotor (non-verbal) to concrete (the here and now).

Identity Process Theory

According to Erikson's theory, identity is a central issue in adulthood. How identity changes is a question that we will explore throughout this book. We will rely heavily on the framework of **identity process theory** (Whitbourne et al., 2002), which proposes that identity continues to change in adulthood in a dynamic manner.

In identity process theory, **identity** is defined as a set of schemas that the person holds about the self. Your identity is your own answer to the question "Who am I?" For most people, this includes their views about their physical self, their cognitive abilities, their personality characteristics, and their social roles. Identity also includes the individual's sense of connection to his or her cultural heritage, a process of particular importance to adolescents and emerging adults from immigrant and minority groups (Rodriguez et al., 2010; Schwartz et al., 2012).

Identity Assimilation, Identity Accommodation, and Identity Balance. Refer to Figure 2.7, which depicts two pathways through which individuals change their self-schemas, or identities. Age-related changes occur continuously throughout adulthood, but trigger identity processes only when they are regarded as important by the individual. Such age-related changes can be interpreted through **identity assimilation**, or a tendency to interpret new experiences in terms of existing identity. This process will minimize the impact of the age-related change on the individual's sense of self, putting off any identity change.

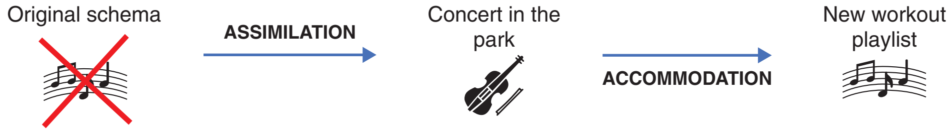
Alternatively, the age-related change may trigger **identity accommodation** in which people make changes in their identities in response to experiences that challenge their current view of themselves. Initially, this response to change may potentially create the feeling of being "over the hill," as shown in Path 2.

Eventually, the individual either finds denial no longer possible (Path 1) or is able to gradually re-establish a more stable sense of self (Path 2) and eventually achieves **identity balance**, the dynamic equilibrium that occurs when people tend to view themselves consistently but can make changes when called for by their experiences.

To illustrate the process of identity change proposed by identity process theory, consider an example from your own life as a student. You may have a positive identity of yourself as a student, seeing yourself as achieving your educational goals. This view of yourself colours your academic experiences. If you are, in fact, a good student, you'll have plenty of instances

FIGURE 2.6

Piaget's Theory



Piaget's theory proposes that people change their schemas in response to new experiences. In this figure, the original schema of not liking classical music is changed when the individual enjoys a classical music concert, leading to a revised schema as shown in a new workout playlist.

that bolster this view. You receive good grades, your professors seem to like you, and other people come to you for help. Occasionally, however, you may have experiences that contradict this self-image. You do poorly on an exam, an assignment is returned with many critical comments, or you're stumped in class when you're called upon to answer a question. How do you reconcile these experiences with your positive identity as a student? If you're using identity assimilation, you won't change your identity at all. Instead, you'll still see yourself as a good student, but one who ran into some rough material, an unfair test, or an inordinately harsh professor.

When people use identity assimilation, they tend to resist changing their identities in the face of criticism or disconfirming experiences. In fact, most people prefer to see themselves in the positive light of being physically and mentally competent, well liked, honest, and concerned about the welfare of others. The advantage of identity assimilation is that it allows people to feel reasonably happy and effective, despite being less than perfect. The downside of identity assimilation is that it can lead you to distort your interpretation of experiences when change would truly be warranted. Returning to our example of seeing yourself as a good student, by blaming the material or the professor for your bad grade, you may not realize how your own academic weaknesses contributed to the trouble you're in now.

We can see, then, that although identity assimilation has the advantage of allowing you to preserve a positive view of who you are, there may be negative consequences of refusing to incorporate these experiences into your identity. If you continue to blame the professor or the test for your poor grades, you will never find that you need to change. Eventually, these limitations need to be confronted. Whether this signifies that you are in the wrong major, are not studying hard enough, or may not be as smart as you once thought, learning to accept your imperfections is vital to your own growth.

Thus, ideally, people eventually use identity accommodation, in which they make changes in their identities in response to experiences that challenge their current view of themselves. Identity change may be difficult, particularly at first, because you must come to grips with your weaknesses. However, the result will ultimately produce a self-image that is more in sync with reality.

It's possible, also, for an individual to use identity assimilation to bolster a negative rather than a positive view of the self. As we will learn later in the book, people who suffer from chronic depression often take an unduly pessimistic view of their identities, focusing on their weaknesses to the exclusion of seeing their strengths. In that case, identity accommodation can help them develop a more realistically positive set of schemas about their personal characteristics and strengths.

Identity process theory proposes that both identity assimilation and identity accommodation are most beneficial when they operate in tandem. If you had that tendency to avoid letting your academic disappointments permeate your identity through identity assimilation, it would benefit you to use identity accommodation to acknowledge your areas of weakness, such as not being well-suited to your university major, perhaps. Although you wouldn't want to go overboard and conclude that you should give up school altogether, by using some identity accommodation, you could first admit to your problems and then set up a plan to improve your study habits.

Stephanie Ghesquier/Pixabay

For some individuals, age-related changes in appearance can serve to stimulate identity accommodation.

As with identity assimilation, however, relying too heavily on identity accommodation can have destructive consequences. Individuals who define themselves entirely on the basis of their experiences, such as being viewed negatively by others, may be devastated by an event when they feel rejected. Imagine if every criticism ever levelled at you throughout your life caused you to question your personal qualities and think that you are a deeply flawed person. You would become extremely insecure, and your identity would fail to include the central compass that would ultimately allow you to have confidence in your abilities. In this case, you would benefit by ignoring those experiences that unrealistically caused you to question yourself.

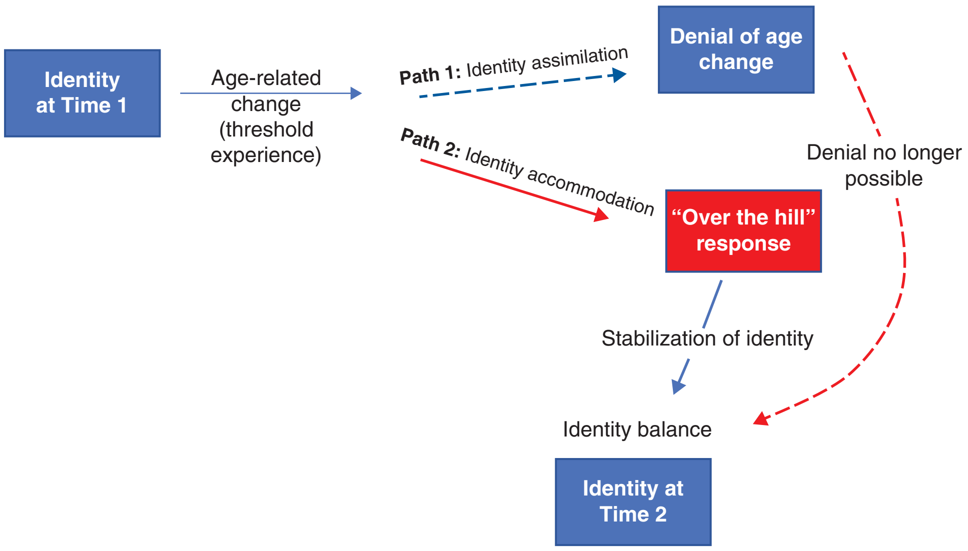
Piaget proposed that the natural tendency is to use assimilation when confronted with a new situation. People use what has worked in the past to help understand what is happening in the present. However, when the situation warrants changes, you should be able to make those adjustments. Though it would hardly be ideal to change your self-view completely when someone criticizes you, if the criticism is consistent enough and comes from enough different quarters, you may be well advised to look honestly at yourself and see whether you should change something.

When identity balance is operating successfully, the individual feels that he or she has a strong sense of **self-efficacy**, a term used in the social psychological literature to refer to a person's feelings of competence at a particular task (Bandura, 1977). As we will see throughout the book, older adults high in particular types of self-efficacy recognize that they have experienced age-related changes but nevertheless feel in control of their ability to succeed.

The Multiple Threshold Model. Figure 2.7 depicts the process of identity change in response to age-related changes

FIGURE 2.7

Identity Process Theory


Identity at Time 1
Age-related change (threshold experience)
Path 1: Identity assimilation
Denial of age change
Path 2: Identity accommodation
"Over the hill" response
Denial no longer possible
Stabilization of identity
Identity balance
Identity at Time 2

Identity process theory proposes that age-related changes become threshold experiences. Paths 1 and 2 illustrate alternate pathways in responding to these experiences in terms of identity.

in functioning. These changes can be thought of as occurring through a sequence of phases over time (Whitbourne & Collins, 1998). The **multiple threshold model** of change in adulthood proposes that individuals realize that they are getting older through a stepwise process as aging-related changes occur. Each age-related change (such as wrinkling of the skin or increased reaction time) brings with it the potential for another threshold to be crossed. People are likely to monitor the areas of the greatest significance to their identities with great care or vigilance, while paying less attention to the thresholds that don't mean as much to them. You may be preoccupied with the fact that your hair is thinning or turning gray but less focused on the changes in your muscles. Someone else may feel oppositely, and disregard gray hair but fixate on the loss of muscle strength.

Whatever the area of greatest relevance, at the point of crossing a threshold, people are prompted to recognize the reality of the aging process in that particular area of functioning. It is during the process of moving from identity assimilation to identity accommodation through the occurrence of these thresholds that a new state of balance is reached. Ultimately, people will only be able to adapt to age-related changes once they have examined the meaning of the change and incorporated it into their existing view of the self.

In Western society, because of ageism, this youthful image is one that many people would like to preserve and therefore they resist making changes to this image. You perhaps feel this way now. It's true that you're no longer an adolescent, but you almost certainly still regard yourself as being young. You may feel this way for years, if not decades, identifying yourself with the younger generation.

It won't be too long, however, until you encounter experiences that lead you to your first "threshold." Perhaps you feel a little stiff when you get up from a chair or find out that your blood pressure is higher than it used to be. Many people say that the first time they felt old was when someone called them "sir" or "ma'am." At that point, you may start to challenge the view you had of yourself as a young person. Your options now are to disregard the whole experience and not change your identity (identity assimilation). Or you might become completely thrown by the experience and conclude that you are heading more swiftly than you hoped to middle age (identity accommodation). It's also possible that you might note the experience, admit that you're not a teenager any more, and feel perfectly fine with the fact that people are treating you with a bit more dignity (identity balance).

Identity assimilation can be healthy or unhealthy. The unhealthy type of identity assimilation occurs when people ignore warning signs that the changes their body is going through require attention. If your blood pressure really is too high, you should explore ways to lower it, no matter what your age. It would not be healthy to deny the condition. On the other hand, a healthy denial occurs when people avoid becoming overly preoccupied with age-related changes that are truly inconsequential to their overall health and well-being, especially if there is nothing they can do to ameliorate the process. Healthy deniers continue or begin engaging in preventive behaviours without overthinking their actions and reflecting at length about their own mortality (Path 1 in Figure 2.7). However, at some point, everyone needs to confront these changes, to some extent. You can't completely ignore the fact that you are getting older no matter what your age. Ultimately, this need to deal with the reality of aging leads the individual to incorporate these changes into identity.

Let's look next at identity accommodation in which people change their identities in response to experiences. Theoretically, identity accommodation helps to keep identity assimilation in check. However, people who conclude that one small age change means they are "over-the-hill" may be just as likely to avoid taking preventative actions as those who engage in unhealthy denial. They incorrectly conclude that there's nothing they can do to slow down the aging process, so why try? Similarly, people who are told they must watch their blood pressure may go overboard and do nothing but worry about what this means for their health. They "become" their illness, which they allow to take over their identity.

Eventually, if the pendulum swings from identity accommodation back to identity assimilation, the individual can re-establish a middle ground between becoming overly preoccupied with change versus pretending that changes are not occurring (Path 2 in Figure 2.7). People who use identity balance accept that they are aging without adopting a defeatist attitude. They take steps to ensure that they will remain healthy but do not become demoralized about conditions or limitations they may already have developed. Additionally, they are not deluded into thinking that they will be young forever.

The advantages of identity balance (and to an extent healthy denial) are that the older adult adopts an active "use-it-or-lose-it" approach to the aging process. By remaining active, people can delay or prevent many if not most age-related negative changes. On the other hand, there are many "bad habits," or ways in which a person's behaviour can accelerate the aging process. Some of the most common negative behaviours, include overexposure to the sun and smoking. Ideally, people adapt to the aging process by taking advantage of the use-it-or-lose-it approach and avoiding the bad habits. Less of a strain will be placed on both identity assimilation and accommodation if people can take advantage of the many strategies receiving increasing publicity designed to promote good health for as long as possible.

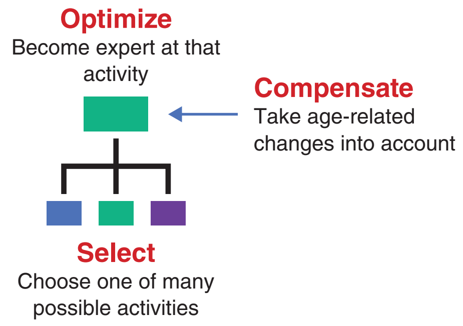
The Selective Compensation with Optimization Model

We see, then, that people adapt mentally to the age-related changes they experience by shifting their priorities. Although it does not refer specifically to identity, a related model focuses on how people balance gains and losses as they age. According to the **selective optimization with compensation model (SOC)**, adults attempt to preserve and maximize the abilities that are of central importance and put less effort into maintaining those that are not (Baltes & Baltes, 1990) (see Figure 2.8). Older people make conscious decisions regarding how to spend their time and effort in the face of losses in physical and cognitive resources.

The SOC model implies that at some point in adulthood, people deliberately begin to reduce efforts in one area in order to focus more on achieving success in another. It is likely that the areas people choose to focus on are those that are of greater importance and for which the chances of success are higher. However, they may also switch within the same general area to make it possible to retain as much of the original activity as possible. Older adults with mobility issues substitute walking for running, for example. Similar processes may operate in the area of intellectual functioning. The older individual may exert more effort towards solving word games and puzzles and spend less time on pastimes that involve spatial and speed skills, such as fast-moving computer games. If reading becomes too much of a chore due to fading eyesight, the individual may compensate by switching to audiobooks.

FIGURE 2.8

Selective Optimization with Compensation Model


Optimize
Become expert at that activity
Compensate
Take age-related changes into account
Select
Choose one of many possible activities

According to the Selective Optimization with Compensation model, aging involves selecting which activities are of greatest importance, compensating for age-related changes, and then optimizing performance of that activity.

Concepts from the multiple threshold model would seem to fit well with the SOC model. People may make choices to optimize those areas of functioning that are central to their identities. Those who value the mind will compensate for whatever changes in their ability to solve mental puzzles by finding other intellectually demanding activities that they can still perform. People who enjoyed crafts that required very fine motor movements that they can no longer perform may switch to projects that they complete on a somewhat larger scale and still feel satisfied. It may be difficult at first, but people who are able to make accommodations to age-related changes without becoming overwhelmed or preoccupied will be able to re-establish their sense of purpose and well-being.

Although the SOC model may seem to present a negative view of aging, in that it emphasizes the way that people adapt to loss, it can also be seen as offering a realistic perspective on the fact that there are losses in adulthood that can often outweigh the gains (Heckhausen, 1997). However, people adapt to these changes by readjusting their goals and, in the process, can maintain their sense of well-being (Frazier et al., 2012).

BIOLOGICAL APPROACHES TO AGING IN ADULTHOOD

Biological approaches to aging tackle the fundamental question of why the body changes over the course of life. As stated by Stanford University's Walter Bortz (2010, p. 383): "What are the generic properties of life, which establish its essence? What is aging? Whatever the answer, it must transcend biology as everything in the universe ages, galaxies, canyons, Chevrolets, redwoods, and turtles." For reasons we don't now understand, the body's biological clock continues to record the years with the passage of time. Ultimately, the aging of the body sets the limit on life's length, but most gerontologists agree that people can compensate through behavioural measures for many of the changes associated with the aging process to alter the timing of these events.

Acknowledging the role of biology begs the question: Why do living organisms grow old and die? If you are a fan of science fiction, you have surely read stories of a world in which aging does not occur or occurs so slowly that people live for hundreds of years. While these fictional accounts may be engrossing and even tempting to imagine, there are some obvious problems associated with such a world. Outcomes such as overpopulation, a lack of adequate resources, and intergenerational strife are just some of the possibilities. Presumably, to keep the population in check, birthrates would be reduced to a virtual standstill.

Some scientists believe that organisms are programmed to survive until they reach sexual maturity. Having guaranteed the survival of their species, living creatures are programmed to deteriorate or diminish once the genes programmed to keep them alive past that point are no longer of use to the species. Biologically speaking, according to this view, reproduction is the primary purpose of life, and once this criterion has been met, there are no specific guidelines to determine what happens next. Although it's not possible to know "why" aging occurs, the fact is that it does. Researchers who study aging continue to explore whether aging is in fact the result of a correctable defect in living organisms. We may not be able to guarantee that the aging process can be ground to a halt, even with the most advanced scientific methods; however, researchers who study aging believe that their efforts will result in concrete improvements to people's lives.

Genes and DNA

To understand the biological approaches to aging, we need to explain several basic concepts about genetics. Our focus will be on those aspects of genetics most relevant to theories of aging to give you some of the background needed to understand this material.

To begin, inherited characteristics are found in the **genome**, the complete set of instructions for "building" all the cells that make up an organism. The human genome is found in each nucleus of a person's many trillions of cells. The genome is contained in **deoxyribonucleic acid (DNA)**, a molecule capable of replicating itself that encodes information needed to produce proteins. There are many kinds of proteins, each with different functions. Some proteins provide structure to the cells of the body, whereas other proteins called enzymes assist biochemical reactions that take place within the cells. Antibodies are proteins that function in the immune system to identify foreign invaders that need to be removed from the body.

A **gene** is a functional unit of a DNA molecule carrying a particular set of instructions for producing one of those proteins. Some of the proteins that the genes encode provide basic housekeeping duties in the cell. These genes constantly stay active in many types of cells; more typically, a cell activates just the genes needed at the moment to carry out a task and suppresses the rest. Through this process of selective activation of genes, a cell becomes a skin cell, for example, rather than a bone cell.

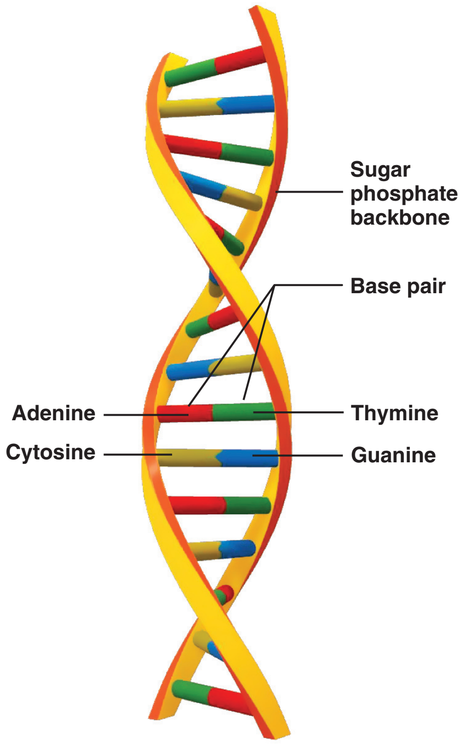
Human genes vary greatly in length, but only about 10 percent of the genome actually contains sequences of genes used to code proteins. The rest of the genome contains sequences of bases that have no apparent function.

The genome is organized into **chromosomes**, which are distinct, physically separate units of coiled threads of DNA and associated protein molecules. In humans, there are two sets of 23 chromosomes, one set contributed by each parent. Each set has 23 single chromosomes: 22 are called "autosomes" and contain non-sex-linked information, and the 23rd is the X or Y sex chromosome. The presence of the Y chromosome determines maleness, so that a normal female has a pair of X chromosomes and a male has one X and one Y in the 23rd chromosome pair. There is no rhyme or reason to the distribution of genes on chromosomes. A gene that produces a protein that influences eye colour may be next to a gene that is involved in cellular energy production.

All the genes in DNA are formed by the pattern of four nucleotides: adenine (A), guanine (G), thymine (T), and cytosine (C) as shown in Figure 2.9. One DNA segment, for example, might be composed of a sequence such as AATCGCGTAC. A **single-nucleotide polymorphism (SNP)** is a small genetic

FIGURE 2.9

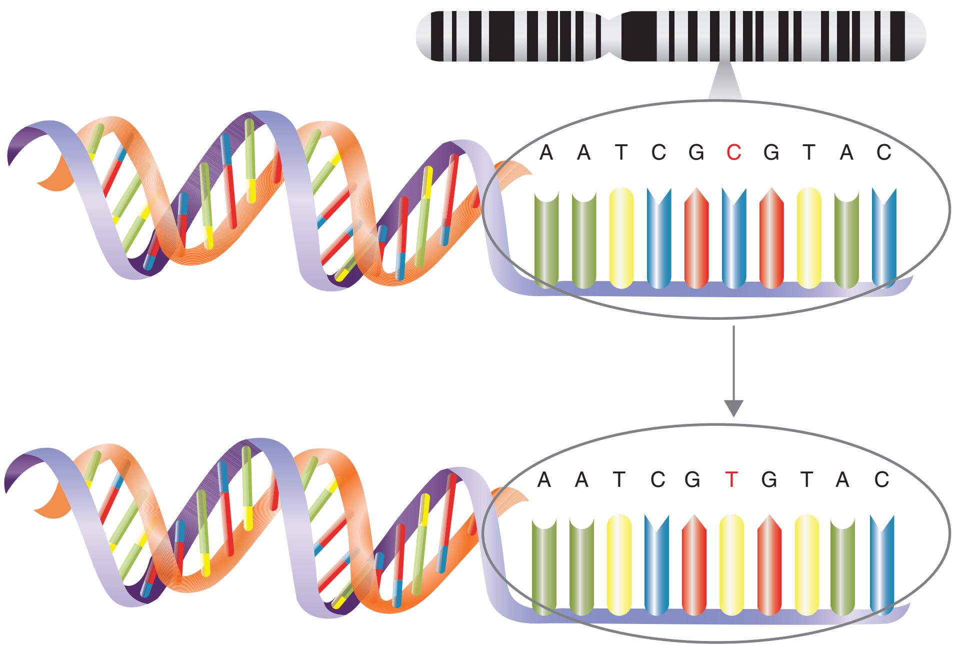
DNA Structure



The structure of DNA is shown here, illustrating the four nucleotides as arranged in the double helix along a backbone of sugar phosphate.

FIGURE 2.10

Example of an SNP



As shown in this figure, which represents a genetic sequence, a single nucleotide differentiates one genetic variation from another (i.e., single-nucleotide polymorphism).

variation that can occur in a person's DNA sequence in which one nucleotide is substituted for another (see Figure 2.10). To qualify as an SNP, the variation must occur in at least 1 percent of the population.

When DNA reproduces itself, the process often occurs without a problem, and the DNA copy is the same as the original molecule. However, for various reasons, genes may undergo alterations known as **mutations**. Genetic mutations are either inherited from a parent or acquired over the course of one's life. Inherited mutations originate from the DNA of the cells involved in reproduction (sperm and egg). When a gene contains a mutation, the protein encoded by that gene will most likely be abnormal. Sometimes, the protein can function despite the damage, but in other cases, it becomes completely disabled. If a protein vital to survival becomes severely damaged, the results of the mutation can be serious.

When reproductive cells containing mutations are combined in one's offspring, the mutation is in all the bodily cells of that offspring. Inherited mutations are responsible for diseases such as cystic fibrosis and sickle cell anemia. They also may predispose an individual to developing cancer, major psychiatric illnesses, and other complex diseases.

Acquired mutations are changes in DNA that develop throughout a person's lifetime. Remarkably, cells possess the ability to repair many of these mutations. If these repair mechanisms fail, however, the mutation can be passed along to future copies of the altered cell. Mutations can also occur in the mitochondrial DNA, which is the DNA found in the tiny structures within the cell called mitochondria. These structures are crucial to the functioning of the cell because they are involved in producing cellular energy. Unlike DNA found elsewhere in the cell, mitochondrial DNA is inherited solely from the mother.

Geneticists have provided many fascinating and important perspectives on the aging process. The completion of the Human Genome Project in 2003 and progress by the International HapMap project (Frazer et al., 2007; Green et al., 2015) paved the way for researchers to identify successful analytic techniques to map complete sets of DNA. A **genome-wide association study** is a method used in behaviour genetics in which researchers search for genetic variations related to complex diseases by scanning the entire genome. Another method in behaviour genetics is a **genome-wide linkage study**, in which researchers study the families of people with specific psychological traits or disorders. These methods offer a promising avenue for research on the genetics of aging. Hundreds of studies have successfully identified novel genes involved in aging-related diseases such as heart failure (Velagaleti & O'Donnell, 2010), Alzheimer's disease (Harold et al., 2009), and osteoarthritis (Richards et al., 2009). Genetic sequencing studies are also becoming the basis for understanding the mechanisms of action of therapeutic drugs (Choi et al., 2018).

As genomic research continues to make advances in understanding the complexity of disease and genes, more and more individuals will be offered the opportunity to have their genome scanned to determine their risk for developing a disease. The availability of online genetic testing through commercial websites also makes it possible for anyone to explore their own genetic risks, as well as family ancestry. These approaches will bring genomics increasingly into people's everyday lives and could ultimately help individuals make lifestyle and medical decisions in a more informed manner than has ever been possible.

Programmed Aging Theories

Genetics are involved in all biological theories of aging, but to differing degrees (Hayflick, 1994). **Programmed aging theories** propose that aging and death are built into the hard-wiring of all organisms and therefore are part of the genetic code. Every living organism has, then, "aging genes" that count off the years past maturity, just as "development genes" lead to the point of maturity in youth.

One argument long used to support programmed aging theories is based on the fact that species have different life spans (see Figure 2.11). For example, vampire bats have life spans of 13 weeks, and giant tortoises have life spans of 184 years. Humans have the longest life span of any mammals at 122 years. The fact that life spans vary so systematically across species supports the role of genetics in the aging process, according to many biologists.

Variations among species in life spans are clearly illustrated when age is plotted against death rates. The **Gompertz function** plots the relationship between age and death rates for a given species. The originator of this idea, Benjamin Gompertz, was an 18th-century British mathematician who worked as an actuary, a profession where the financial impact of risk is calculated. In 1825, he applied calculus to mortality data and showed that the mortality rate increases in a geometric progression with age (Gompertz, 1825). In other words, the longer an individual lives, the higher the chances that the individual will die, a fact that Gompertz represented mathematically. Gompertz's work is still considered relevant today, 350 years after his groundbreaking paper (Kirkwood, 2015).

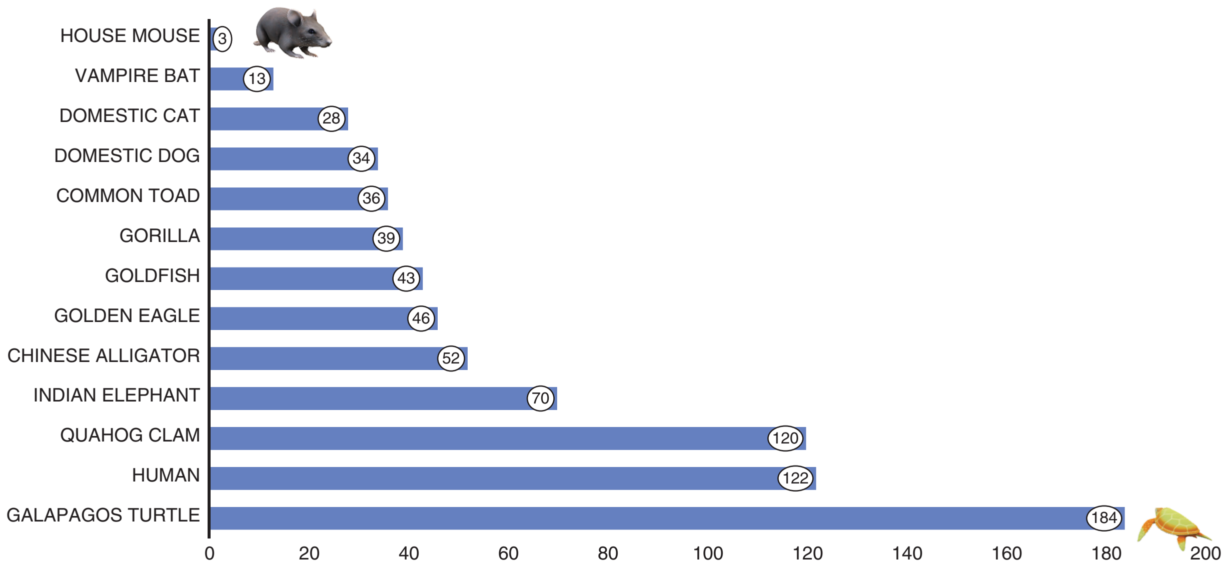
Within humans, researchers estimate that longevity is at least 25 percent inherited. However, the estimate of longevity's genetic influence increases for life spans that go beyond the age of 60 years. Perhaps as much as 33 percent of the life span in women and 48 percent of that in men living to 100 can be attributed to genetics (Sebastiani & Perls, 2012).

Findings in support of genetic theories of aging are particularly intriguing in view of the considerable progress being made in the field of genetics in general. The ability to identify and then control the "aging" gene or genes would go a long way towards changing the very nature of aging. The idea that there is one single gene or small combination of multiple genes that control the aging process from birth to death is very appealing, but the approach has its limits. We cannot say for sure that evolution has selected for the aging process so that old generations die in order to make room for new ones. Historically, few species survive long enough to provide data relevant to the evolutionary selection process.

A more defensible alternative to genetic theory is that evolution has selected for species that are vigorous through the period of optimal sexual reproduction and then less important once that period has passed. According to the "good genes gone bad" theory (Hayflick, 1994), also known as the quasi-programmed aging theory (Blagosklonny, 2013), aging genes take over in the postreproductive years and lead to the ultimate destruction of the organism. Researchers continue to investigate the notion that the very genes that have a positive effect on development during early life lower the susceptibility to a variety of diseases in later life (Caruso et al., 2000). For example, senescent cells may act as a protective device against the continued growth of cancerous cells. The senescent cells, in turn, are eliminated by

FIGURE 2.11

Life Spans of Different Species



Programmed aging theories receive support from the fact that the life span of different species appear to be set by genetics.

the immune system. However, the immune system does not destroy all of the senescent cells, and so they continue to remain present in the body's tissues (Hornsby, 2009).

The first important set of theories that attempt to explain aging through genetics are based on the principle of **replicative senescence**, or the loss of the ability of cells to reproduce. Scientists have long known that there are a finite number of times (about 50) that normal human cells can proliferate in culture before they become terminally incapable of further division (Hayflick, 1994). Until relatively recently, scientists did not know why cells had a limited number of divisions. It was only when the technology needed to look closely at the chromosome developed that researchers uncovered some of the mystery behind this process.

As we saw in Figure 2.9, the chromosome is made up largely of DNA. However, at either end of the chromosomes are **telomeres**, repetitive DNA sequences at the ends of chromosomes (see Figure 2.12). The primary function of the telomeres is to protect the chromosomes from the damage to them that accumulates over repeated cell replications. With each cell division, the telomeres shorten, eventually leading to damage of the genome. Once telomeres shorten to the point of no longer being able to protect the chromosome, adjacent chromosomes fuse, the cell cycle is halted, and ultimately the cell dies. Evidence linking telomere length to mortality in humans suggests that the telomeres may ultimately hold the key to understanding the aging process (Shay, 2018).

However, biology does not completely explain the loss of telomeres over the course of life. Supporting the idea of biopsychosocial interactions in development, researchers have linked telomere length to social factors. Initial findings indicated that socioeconomic status and lifestyle (i.e., exercise) seemed to be related to telomere length in women (Cherkas et al., 2006, 2008). However, a large-scale analysis of 29 different study populations including men and women pointed to education, but not current social status, as having a weak link to biological aging as measured by telomere length (Robertson et al., 2013).

On the other hand, at least for older men, participation in high levels of exercise over a prolonged period could serve to have a protective role in preserving telomere length. Indeed, the longer and higher intensity of the activity, the more beneficial the effects on telomere length (Arsenis et al., 2017).

Although many cells in the body are thought to be affected by the shortening of the telomeres, not all experience this effect of the aging process. For example, when tumour cells are added to normal cells, they replicate indefinitely. Because of the danger posed by these multiplying tumor cells, senescence may be thought of as a form of protection against cancer. The key to extending the life span based on the telomere theory would be for scientists to find a way to keep cells replicating longer without increasing the risk of cancer cell proliferation (Ohtani et al., 2009).

Another compelling candidate for a genetic cause of aging involves the **FOXO genes**, a group of genes that influence crucial cellular processes regulating stress resistance, metabolism, the cell cycle, and the death of cells. FOXO is actually shorthand for "forkhead box O," with the forkhead referring to its winged helix (butterfly-like) structure (Stefanetti et al., 2018). The FOXO3 variant includes approximately 40 SNPs associated with longevity in humans and is also associated with healthier skeletal muscle and the functioning of cells that maintain healthy functioning in the brain. The exact mechanisms through which FOXO3 operates remain yet to be determined, but research on how it exerts its longevity effects will undoubtedly produce important results in the coming years (Stefanetti et al., 2018).

Random Error Theories

Random error theories are based on the assumption that aging reflects unplanned changes in an organism over time. The **wear and tear theory** of aging is one that many people implicitly refer to when they say they feel that they are "falling apart" as they get older. According to this view, the body, like a car, acquires more and more damage as it is exposed to daily wear and tear from weather, use, accidents, and mechanical insults. Programmed aging theories, in contrast, would suggest that the car was not "built to last" but rather meant to deteriorate over time in a systematic fashion.

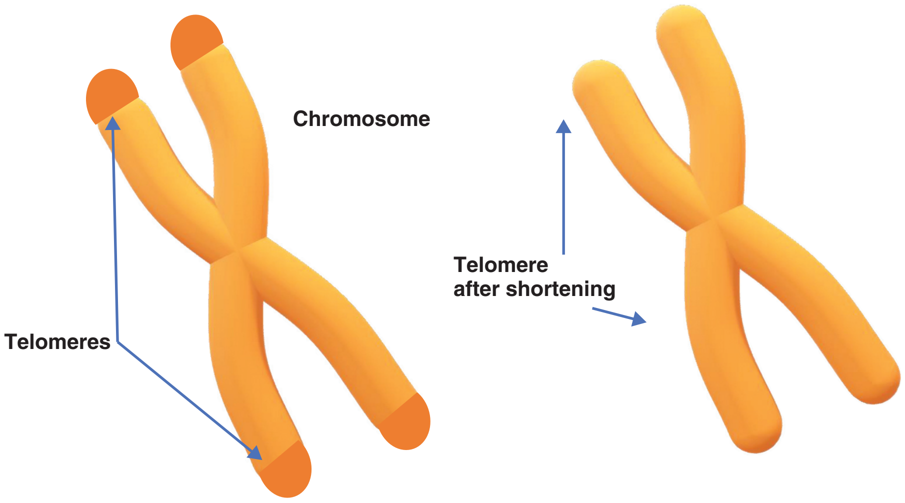


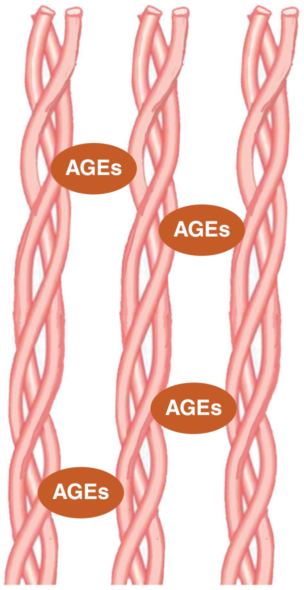
FIGURE 2.12

Telomere Theory of Aging

The telomere theory of aging proposes that with each cellular replication telomeres shorten until they are no longer present to protect the ends of chromosomes.

FIGURE 2.13

Aging of the Collagen Molecule



According to the cross-linking theory of aging, advanced glycation end products ("AGEs") form between collagen molecules, causing them to lose elasticity.

Cross-linking theory proposes that aging causes deleterious changes in cells of the body that make up much of the body's connective tissue, including the skin, tendons, muscle, and cartilage. The cross links develop in **collagen**, the fibrous protein that makes up about one-quarter of all bodily proteins (see Figure 2.13). Collagen provides elasticity and strength to tissues that are involved in mechanical function, including skin, cartilage, tendons, and bones. The collagen molecule is composed of three chains of amino acids wound together in a tight helix. Strands of collagen molecules are attached through horizontal strands of proteins, similar to rungs on a ladder.

Increasingly with age, the rungs of one ladder start to connect to the rungs of another ladder, causing the molecules to become increasingly rigid and shrink in size. The process of cross-linking occurs because exposure to certain types of sugars leads to a process known as glycation, which in turn leads to the formation of what are called advanced glycation end products (appropriately named "AGE"). The AGEs induce cross-linking of collagen, which in turn can contribute to increased stiffness in skeletal muscle and cartilage (Semba et al., 2010) as well as tendons (Snedeker & Gautieri, 2014).

An issue yet to be determined is whether the cross-linking theory adequately explains the cause of aging or whether it describes a process that occurs due to the passage of time and cumulative damage caused by a lifetime of exposure to sugar in the diet. Another theory focuses on **free radicals**, unstable oxygen molecules produced when cells create energy (see Figure 2.14). The primary goal of a free radical is to seek out and bind to other molecules. When this occurs, the molecule attacked by the free radical loses functioning. According to **free radical theory** (Sohal & Orr, 2012), the cause of aging is the increased activity of these unstable oxygen molecules that bond to other molecules and compromise the cell's functioning.

Although oxidation caused by free radicals is in fact a process associated with increasing age, researchers have questioned the utility of free radical theory to explain the aging process in general (Gladyshev, 2014). **Antioxidants**, chemicals that prevent the formation of free radicals, are advertised widely as an antidote to aging. The active ingredient in antioxidants is the enzyme superoxide dismutase (SOD). No doubt you have seen advertisements that promote the intake of foods high in vitamins E and C, including grapes, blueberries, strawberries, and walnuts. There is scientific evidence supporting the role of antioxidants in cognitive aging, especially when combined with physical activity (Freitas et al., 2017).

Although free radical theory itself does not seem to be able to explain the aging process, there are variants of the theory that focus on antioxidants as contributors to rate of aging. One of these is **caloric restriction**, the view that the key to prolonging life is to restrict the total number of calories that individuals consume (Walford et al., 2002). Caloric restriction is thought to have a beneficial impact in part because it reduces the formation of free radicals. After many years of experimental research involving non-human species, including primates, evidence is beginning to emerge to support the value of caloric restriction in humans, with or without exercise (Colman et al., 2014).

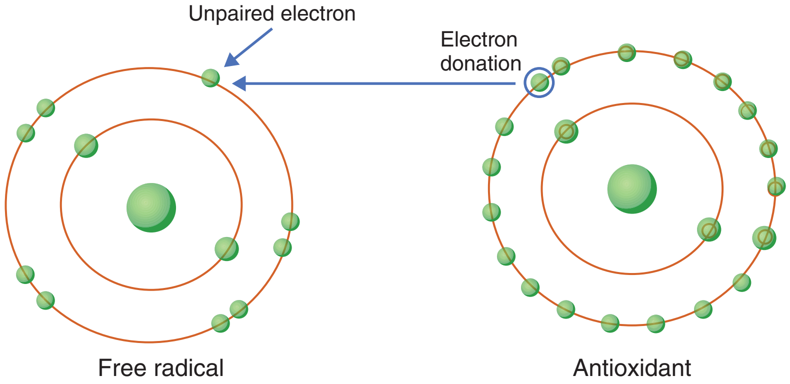


FIGURE 2.14

Free Radical Theory of Aging

The free radical theory of aging proposes that free radicals (unpaired electrons) cause cellular damage. Antioxidants protect the cell by contributing electrons to stabilize the free radicals.

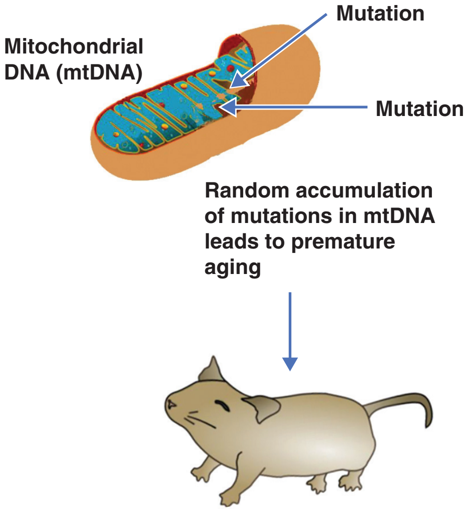
Another offshoot of free radical theory suggests that resveratrol, a natural compound found in grapes and consequently wine, could be a highly potent antioxidant (Pearson et al., 2008). However, for humans, the amount of wine needed to approximate the beneficial effects of resveratrol on mice would be so high that no one person could drink enough in a day to be able to see life-extending effects. There is still considerable interest in resveratrol, though, and researchers believe that its effects could be comparable to those achieved by caloric restriction (Li et al., 2017).

The **autoimmune theory** of aging is not a major theory of aging, yet deserves mention as another approach to understanding the causes of aging. The autoimmune theory proposes that aging is due to faulty immune system functioning in which the immune system attacks the body's own cells. Although not a major theory of aging in its own right, it deserves mention because autoimmunity is at the heart of certain diseases prevalent in older adults, such as some forms of arthritis, systemic lupus erythematosus, and cancer (Watad et al., 2017). Additionally, as you will learn in Chapter 4, there are significant effects of aging on the immune system. Despite the importance of the immune system to health, as a theory of biological aging, the autoimmune theory does not seem to provide a broad enough explanation to account for the aging process in general.

Error theories of aging propose that mutations acquired over the organism's lifetime lead to malfunctioning of the body's cells. According to the **error catastrophe theory**, the errors that accumulate with aging are ones that are vital to life itself. The source of the errors, furthermore, may be associated with the mutations in the mitochondrial DNA, the so-called "powerhouse" of the cell, passed down from the mother (Sun et al., 2016). This process is shown in Figure 2.15. For example, mice with mutations in the mitochondrial DNA show accelerated signs of aging, including graying, hair loss, and loss of muscle mass and spine strength (Kukat & Trifunovic, 2009). Researchers continue to investigate the role of mitochondrial DNA as they seek to translate findings from mouse models to human aging (Ma et al., 2018; Payne & Chinnery, 2015).

FIGURE 2.15

Error Catastrophe Theory


Mutation
Mitochondrial DNA (mtDNA)
Mutation
Random accumulation of mutations in mtDNA leads to premature aging

When mitochondrial DNA is damaged by mutations, as shown here, specially bred mice show signs of premature aging.

At present, we can conclude that biologists have made significant advancements in trying to solve the puzzle of why humans and our counterparts across the animal kingdom experience the changes associated with aging that eventually lead to death. However, no one theory has emerged as more compelling than any other. At the present time, genetic theories are considered more likely to hold the ultimate answer, but other approaches cannot yet be ruled out. Though it is likely that aging ultimately will be accounted for by a combination of these theories, it is also likely that some theories provide better ways to understand age-related changes in the body than others. Rather than exploring one overarching theory, many researchers take the approach of applying specific theories to specific alterations with age in particular organ systems or tissues, such as using cross-linking theory to explain changes in the body's connective tissues. Other researchers may propose, in contrast, that defects in the mitochondrial DNA are the most important biological changes to understand in regard to aging.

Although not yet elevated to the status of a theory, the impact of environmental stress on DNA is one of the newest areas of investigation in the biology of aging. In a process known as DNA methylation, the sequences of amino acids in a gene are altered by exposure to harmful conditions. These can have pronounced effects during fetal development, such as when the mother experiences stress during pregnancy but can also alter genetic expression throughout life influencing the individual's susceptibility to diseases that become more prevalent in later life (Johnson et al., 2012). In this way, environmental factors interact with genetic predisposition to influence the individual's rate of aging.

Finally, in looking at perspectives on the aging process that derive from the social sciences, it is important to keep in mind the central role of biological factors. These factors form the "nature" component to the complex "nature–nurture" interactions assumed to characterize development in the adult years. Clearly, all three models must be brought to bear in attempting to understand the complexities of nature and nurture.

SUMMARY

1. The life-span perspective views development as continuous from childhood to old age and incorporates the effects of sex, ethnicity, social class, religion, and culture. The term "developmental science" is emerging to reflect the need to take a broad, interdisciplinary approach to the study of change over time, including the fields of biology, health, and sociology.
2. The three prominent models of developmental science offer differing emphasis on genetics, the environment, and the interaction of the two. The organismic model proposes

that heredity drives the course of development throughout life and that changes occur in a series of stages over time because individuals are programmed to exhibit behaviours at certain ages. The mechanistic model proposes that people's behaviour changes gradually over time, shaped by the outside forces that cause them to adapt to their environments. Rather than clear-cut stages, development is viewed as a smooth, continuous set of gradations as the individual acquires new experiences. The interactionist model of development emphasizes processes such as niche-picking, in which there is a reciprocal interaction between the individual and the environment. The concepts of multidimensionality and multidirectionality are central, and plasticity is considered an important element of development. The biopsychosocial perspective fits within the interactionist model.

3. Sociocultural models of development emphasize the effects of the environment on individuals, focusing on variables such as age and sex structures within the population, income, and social class. Ecological perspectives examine multiple levels of organization within the environment, such as the proximal social relational level and the sociocultural level. The life course perspective highlights age-related norms, roles, and attitudes as influences on individuals. Age norms in adulthood are tied to the social clock, the expectations for the ages at which a society associates with major life events. Theories that relate the well-being of the older individual to the level of social involvement include disengagement theory, activity theory, and continuity theory. These propose different relationships between individuals and society.
4. Ageism is a set of stereotyped views about older adults, reflected in negative as well as positive images. Some historians believe that older adults were more highly regarded in preindustrial societies, a view known as the modernization hypothesis. However, it appears that mixed views of aging have existed throughout history and across cultures. According to the multiple jeopardy hypothesis of aging, older adults who are of minority status and are female face more discrimination than White male individuals. In contrast, the age-as-leveller view proposes that as people become older, age overrides all other "isms." Older adults potentially facing multiple jeopardy may also be protected from its effects and even perhaps fare better than those with higher social standing. According to the inoculation hypothesis, older minorities and women have actually become immune to the effects of ageism through years of exposure to discrimination and stereotyping.
5. Erikson's psychosocial development theory is an important psychological model of development in adulthood. It proposes a series of eight psychosocial crisis stages that correspond roughly to age periods in life in the growth of psychological functions. The eight stages follow the epigenetic principle, which means that each stage builds on the ones that come before it. However, later stages can appear at earlier ages, and early stages can reappear later in life. According to Piaget's theory of development, individuals gain in the ability to adapt to the environment through the processes of assimilation and accommodation. The ideal state of development is one of equilibration or balance. According to the identity process theory, identity assimilation and identity accommodation operate throughout development in adulthood as the individual interacts with experiences. The multiple threshold model was proposed as an explanation of how identity processes influence the interpretation of age-related events such as changes in physical or cognitive functioning.
6. According to the selective optimization with compensation (SOC) model, adults attempt to preserve and maximize the abilities of central importance and put less effort into maintaining those that are not. Older people make conscious decisions regarding how to spend their time and effort in the face of losses in physical and cognitive resources.
7. There are two major categories of biological theories, all of which regard aging as the result of changes in the biological makeup of the organism. Programmed aging theories are based on the observation that species differ in life spans (represented by the Gompertz equation) and propose that aging is genetically determined. The telomere theory, which emerged in part from observations of replicative senescence, proposes that cells are limited in the number of times they can reproduce by the fact that each replication involves a loss of the protective ends of chromosomes known as telomeres. Random error theories view aging as an accident resulting from cellular processes that have gone awry, including the cross-linking, free radical, autoimmune, and error theories. As yet, there is no one biological theory that has gained widespread acceptance, and it is likely that aging will ultimately be understood as due to some combination of biological, psychological, and sociocultural processes.

3

The Study of Adult Development and Aging: Research Methods

We know how exciting adult development and aging research methodology can be. Here are some fun facts about aging based on the latest research methods in the field.

AGEFEED

#trending

1. The Terman Study of the Gifted and Talented was started almost 100 years ago and is still up and running.
2. The Institute of Aging was established by the Canadian Institutes of Health Research to improve the quality of life and health of older Canadians.
3. Did you love playing with worms as a kid? The nematode worm is giving us new insights into how to slow down aging and prevent disease.
4. The Canadian Longitudinal Study on Aging is a long-term study of over 50,000 individuals who will be assessed over time to better understand how to live long and live well. There are more than 160 researchers from 26 universities involved in the research.
5. The Canadian Association on Gerontology was founded in 1971 with the mission of improving the lives of older Canadians through the dissemination of knowledge in gerontological policy, practice, research, and education.
6. Gerontology education is on the rise. There are currently 36 Research Centres on Aging across Canada.
7. Did you know sharks don't get cancer? Research at the Save Our Seas Foundation Shark Research Centre in Florida suggests that they are protected by DNA mutations. These findings may help with treating age-related diseases in humans.
8. "Artificial intelligence (AI)" isn't just for robots. AI is helping medical researchers to sort through medication data to help treat human disease.
9. Looking at life under water helps understand ways to treat and prevent diseases, with reports of this type of research dating all the way back to China in **2953** B.C.E.!
10. The Canadian Coalition for Seniors' Mental Health advocates for and promotes mental health by providing evidence-based resources for older adults, families, and clinicians.

For many people, aging implies a complete loss of sexuality. Yet, logically, there is no reason why anyone 40, 50, 60, or older should give up their sex lives. Why do we "de-sex" our elders? One obvious reason is that if people older than you are having sex, this could mean that your parents—or worse—your grandparents are "doing it." That's a tough image for many people to swallow. The National Social Life, Health, and Aging Project (NSHAP) was conducted on a large national sample of adults 57 to 85 years of age. The study was intended to test the hypothesis that older adults with strong sexual and intimate relationships would have more favourable health in general. They defined sexuality as reflecting a combination of physical ability, motivation, attitudes, opportunity, and actual sexual behaviour (Waite et al., 2009).

You might wonder just how to go about constructing a survey to test these potentially sensitive personal questions, particularly among people who (if the stereotypes are true) would feel uncomfortable answering them. However, the researchers believed that the best way to get the information was just to ask for it. They certainly respected their respondents, but didn't hesitate to ask them the tough questions that needed to be answered to gain as complete a picture as possible of their sexual history, practices, and attitudes. They clearly had to get over the mindset that they were asking their parents, or their grandparents, to provide such private information. The best way to approach this problem was to make the questions as straightforward as possible, to act professionally, and not to become embarrassed themselves by the answers they were getting.

The researchers obtained much of the information about sexuality through interviews, including the standard information about sex and marital status of the respondents. These were reasonably straightforward questions, the stuff of much survey research. The questions became more delicate, however, if respondents weren't married. People who answered something other than being married or cohabiting were asked if they had a romantic, intimate, or sexual partner. The interviewers then went on to ask the remaining questions about this sexual partner, whom they labelled the "current partner." Remember, again, that some of these respondents could have been as old as 85 years. You might think of questions about a sexual partner as more appropriate for a person 50 or more years younger than these participants. If so, you're already confronting one of the stereotypes that we have about aging. This reaction can give you insight into why scientific objectivity is so important in any kind of research, but particularly in research that touches on sensitive topics such as sexuality and aging. Clearly, attitudes about aging can potentially lead to significant experimenter bias and result in studies that are methodologically flawed because of ageist stereotypes.

Researchers in the field of adult development and aging may not agree on the cause of aging, but it is clear that aging is inherently linked with the passage of time. In this chapter, we will examine the innovative research strategies developed to tackle the unique challenges in research on aging, as well as the procedures in collecting information that form the knowledge base of the field.

VARIABLES IN DEVELOPMENTAL RESEARCH

Understanding why people vary as a function of their age is at the heart of the study of development. A characteristic that "varies" from individual to individual is known as a **variable**. In scientific research in general, the **dependent variable** is the outcome that researchers observe. The **independent variable** is the factor that the researcher manipulates. The researcher can set the value of the independent variable according to the study's conditions. Researchers choose these variables to test a particular hypothesis. The hypothesis, in turn, is based on the question the researcher wishes to investigate. Typically, these questions arise from a theoretical interest of the researcher. Age is indeed a variable, and the trick in developmental research is to show both how and why people with different ages differ on particular measures, due to physical, psychological, or sociocultural factors.

In an **experimental design**, researchers study a question of interest by deciding on conditions that will allow them to manipulate a particular independent variable. Participants receive assignment to groups that either receive the treatment (the "treatment" or "experimental" group) or do not receive the treatment ("control" group). The key to the experimental method is the random assignment of participants to these groups. There can be no systematic basis for the researcher to determine that some people receive the treatment and others do not.

This condition of random assignment of participants to groups makes it difficult to conduct experimental research on aging. An experimenter cannot randomly assign people to a particular age group by making some people young and some people old. This means that you can never state with certainty that aging "causes" people to receive certain scores on a dependent variable of interest. Studies on aging therefore suffer from the problem that age is not a true "independent" variable because its value cannot be set by the experimenter.

Researchers cannot assign ages to their participants, but they can devise experiments that make it possible to study how different experimental conditions affect people of different ages. For example, consider an experiment in which the experimenter wishes to test the hypothesis that the memory performance of older adults is particularly sensitive to instructions that help them to feel more confident going into the experiment. To test this hypothesis, the researcher compares older and younger adults in two conditions. In the experimental condition, the researcher gives the confidence-boosting instructions to both age groups prior to the memory test. In the control condition, the researcher provides standard instructions to both age groups prior to the test. The independent variable is the instructions and the dependent variable is memory performance. The experimenter then compares memory scores in the two age groups and the two conditions. If people in both age groups get higher scores in the experimental group, but the older adults improve more, the researcher would have evidence to support the hypothesis that the memory performance of older adults is influenced by the wording of instructions and that this might be a function of age. Further steps would be needed to ensure this possibility, as we will discuss later, but at least one aspect of the non-random assignment to groups would have been addressed.

Because age cannot be experimentally manipulated, we say that studies of aging represent the **quasi-experimental design** in which researchers compare groups on predetermined characteristics. The same is true of studies that examine sex/gender, ethnicity, social class, nationality, or religion. You cannot conclude that the predetermined characteristic caused the variations in the dependent variable, but you can use the results to describe the differences between groups. Whitehall II is an example of a study using social class as a quasi-experimental variable. The researchers can describe the relationship between social class and health but cannot conclude that social class "caused" different groups of workers to have different levels of health or even different types of health conditions. Researchers can, however, try to rule out as many competing explanations as possible, using methods we will describe later in the chapter.

DESCRIPTIVE (SINGLE-FACTOR) RESEARCH DESIGNS

Because studies of aging are, by definition, quasi-experimental, researchers cannot draw cause-and-effect conclusions from the findings. Studies on aging suffer additionally because effects that appear to be due to age may also represent effects of historical time. The problem of disentangling personal from social aging is more than theoretical; it also impacts the conclusions that researchers can draw from their own studies. To be able to make legitimate claims about "age" and not the social or historical period, researchers must be able to build controls into their data, designs, and analyses that can rule out these factors. Fortunately, there are such tricks up the developmental researcher's sleeve. Therefore, even though age is an imperfect variable, many researchers have figured out ways around the thorniest problems it creates.

However, the great majority of studies on aging actually do not build these controls into their designs. Instead of attempting to rule out factors other than age that could influence the pattern of findings, they only categorize the scores of participants on the basis of their age. We use the term **descriptive (single-factor) designs** to refer to studies that catalogue information about how people perform based on their age but do not attempt to rule out social or historical factors.

Age, Cohort, and Time of Measurement

The main problem with descriptive research designs is that, because they only use age to categorize the responses from participants, they cannot rule out competing factors related to historical time. These two factors relate to the period in which the individual was born and the period in which the results are being obtained. To help you understand this problem, we need to explain the concepts of age, cohort, and time of measurement.

Age is an objectively determined measure of how many years (and/or months or days) a person has lived up to the present moment. **Cohort** is the term we use to describe the year (or period) of a person's birth. **Time of measurement** tells us the year or period in which a person is tested. Single-factor designs intended to study age cannot separate the effects of age from these two factors of cohort and time of measurement.

Consider the historical circumstances that affect the performance of people now in their later adult years. People in their 80s now were born at a time (approximately the 1940s) in which many people experienced economic hardship. People born in the "baby boomer" generation and who are now entering later adulthood grew up during the 1960s and 1970s, a very different historical era than that encountered by their parents.

You may not be particularly familiar with the term "cohort," but you almost certainly know about "generational" effects. A generation is simply a period that spans about a 20- to 30-year time frame. Cohort can be any length of time, which is why researchers use it rather than generation.

Cohort effects refer to the social, historical, and cultural influences that affect people during a particular period of time. In many cases, cohort effects are taken to mean the influences present during the early years of development that cause people to behave in a certain way at the current time. For example, the baby boomers were thought to have become their rebellious selves because their parents were so permissive in raising them, a fact that could be traced to the popularity of a particular parenting advice book. When the baby boomers reached their adolescent years, this "anything goes" attitude combined with the natural tendency of teenagers to forge their own paths to produce an authority-flaunting generation. Another way to think about cohort effects, going back to our terminology in Chapter 1, is that they are normative history-graded influences present at or around the time of a person's birth.

Social, historical, and cultural influences that are presently affecting people participating in developmental research are called **time-of-measurement effects**. As used in developmental research designs, time-of-measurement effects are similar to cohort effects in that they are also normative history-graded influences that affect many people who are alive at the same time. In the 2010s, time-of-measurement effects could include the rapid growth of personal technology, a slowing of the world's economy, and the impact of political and social change in the Middle East on global relations. As in Bronfenbrenner's ecological model, time-of-measurement effects may be far removed from the individual, but still impact people indirectly by affecting the conditions that actively impinge on their lives. For example, rising energy costs can limit a family's finances, which, in turn, has an effect on the health of individual family members.

Age will always equal time of measurement minus time of birth (cohort). Similarly, time of measurement is a sum of age and time of birth (cohort). Time of birth must be the difference between time of measurement and age. Because knowing two factors completely explains the third, a simple descriptive design does not allow researchers to conduct appropriate statistical tests. Ordinarily, experimental data do not have this inherent dependency, and it is this dependency that compromises research on aging from a methodological point of view.

Descriptive research designs are unable to offer any solutions to the inevitable confounding of age and context.

Longitudinal Designs

In a study using a **longitudinal design**, people are followed repeatedly from one test occasion to another. By observing and studying people as they age, researchers aim to determine whether participants have changed over time as a result of the aging process. Figure 3.1 shows the data from a typical longitudinal study, in which people are followed over several decades, and their scores compared at each time of testing.

A variant of the longitudinal design is the **prospective study**, in which researchers sample from a population of interest before they develop a particular type of illness or experience a particular type of life event. For example, researchers who wish to study widowhood may recruit participants from a population of married individuals while they are still married. Over the ensuing period of the study, they can expect that a certain percentage of these individuals will suffer the death of their spouses. After that point, the now-widows can be compared to the way they were prior to the loss.

The typical longitudinal studies that psychologists carry out in their labs are very similar to those that you experience in your own life as you watch the people around you change over time. Consider your own experience from the start of kindergarten to high school graduation. Perhaps you attended school with the same set of students throughout high school, watching your friends and peers grow and develop along with you. Perhaps you marvelled at how some friends remained the same over the years while others were not at all like they were when they were younger. Now that you are in university, your relationships with your childhood friends will change even more with the passage of time. You may be an attendant at their weddings or even find romance with past loves.

Fast forward to your 10-year reunion (or if you have already attended yours, reflect back), when you are reminded of the person you were during your adolescent development. Many of your former classmates will look and act the same, and you may remark that the years have done little to change these people. However, other classmates may be difficult or impossible to recognize. Of course, you are also changing along with them. Maybe you were too harsh to judge the cheerleader or nerd, and it is only now that you can see them as the complex and multifaceted people they were all along.

Just as psychologists develop hypotheses about why the participants in their studies change over time, you also develop your own hypotheses regarding reasons for the changes in the people you know. Did the cheerleader who joined the Peace Corps change her personality because of the influence of volunteering in an impoverished nation, or did she choose to volunteer for the Peace Corps because she had a hidden side that none of her friends saw in high school? How about the math whiz? Did he blossom because his business acumen gave him access to a broader social network? Or was he really more social than you realized and was simply waiting until he had more financial resources before letting his true personality shine through?

As with these two examples, researchers also face the challenge of determining whether changes observed over time in longitudinal studies result from the person's own aging or the changing environment in which the person functions. The individual cannot be removed from the environment to see what would happen if he or she had lived in a different time or place. It is simply not possible to know if people are inherently changing or whether they alter as a result of the circumstances in which they are aging. This is the key limitation of longitudinal studies: the inability to differentiate between aging within the individual from changes in the social and historical context.

In addition to this thorny theoretical problem, practical problems also plague longitudinal research. The most significant is perhaps the most obvious. It takes years, if not decades, to see the study come to fruition, making it both expensive and technologically challenging—in other words, it takes money and a great deal of clerical effort to keep the project going. On top of this, the results are not available for many years, meaning

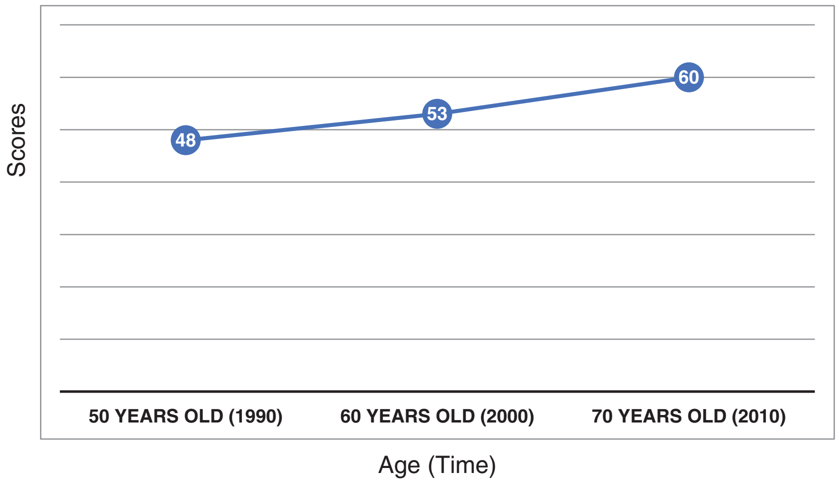


FIGURE 3.1

Sample Longitudinal Study

In an experimental study, the independent variable is randomly assigned; in quasi-experimental studies, the independent variable (such as age) is not randomly assigned.

Pickering
HIGH SCHOOL
180 CHURCH STREET NORTH
50TH ANNIVERS
JUNE 8 9 &
TORONTO MAPLE LEAFS

DAVID COOPER/TORONTO STAR/Getty Images

A longitudinal study in action would follow this famous hockey goaltender, Glenn Healy, over several decades, comparing his assessments at different points in time.

that researchers cannot focus their entire professional energy on this one study. In many cases, the original investigator may not even live long enough to see the results come to fruition.

Further complicating the longitudinal study is the problem of losing participants to death, relocation, or lack of sustained interest. As the number of participants diminishes, researchers find it increasingly difficult to make sense of the data because there are too few participants left to allow for statistical analyses across the multiple time points of the study.

The problem of losing participants is compounded by **selective attrition**, the fact that the people who drop out of a longitudinal study are not necessarily representative of the sample that was originally tested. This non-random loss of participants can occur for a variety of reasons, from illness or death to having become unable to continue in the study in a way related to the study's purpose. If the participants who dropped out were systematically different when the study began from those who remained in it, this creates particularly thorny problems.

Thus, one direct consequence of selective attrition is that the data from the study become increasingly skewed as the study wears on. In a process called **terminal decline**, individuals gradually lose cognitive abilities as they draw closer to death (Hülür et al., 2015). After that point, they quite obviously cannot be tested; however, while they were in the sample in their declining years, they may have pulled down the group's average. The researcher may erroneously conclude that participants in the sample "improved" when in reality, the sicker and perhaps less motivated are simply gone from the sample, leaving the higher performers alone to contribute scores. You can compare this to a marathon run. As the race nears its conclusion, only the hardiest remain on their feet to make it to the finish line. If you had measured the finishers at the beginning of the race, they would have scored higher than the dropouts on such critical factors as endurance and speed.

Figure 3.2 illustrates the problem of selective attrition with a hypothetical longitudinal study conducted over four time points. The bottom line shows the data from Times 1 through 3 of the subgroup who had died by the Time 4 data were collected. As you can see, their scores have steadily declined prior to that point. The top line shows the people who remained in the study across all four times of testing. Their scores did not change at all. However, look now at the average score reflecting the means of scores of people who survived and those who died between Times 3 and 4. This average line heads downwards after Time 1 and then spikes up between Times 3 and 4. On average, scores showed a remarkable increase between Times 3 and 4, but the only reason is that the ones who were in terminal decline (i.e., died after Time 3) are gone. Overall, instead of showing relative stability (as was evident in the top line), the average shows what appear to be distinct patterns of change.

Selective attrition is a special case of non-random sampling, as the successive samples in a longitudinal study become increasingly unlike the populations they were intended to represent and thus were "non-randomly" sampled.

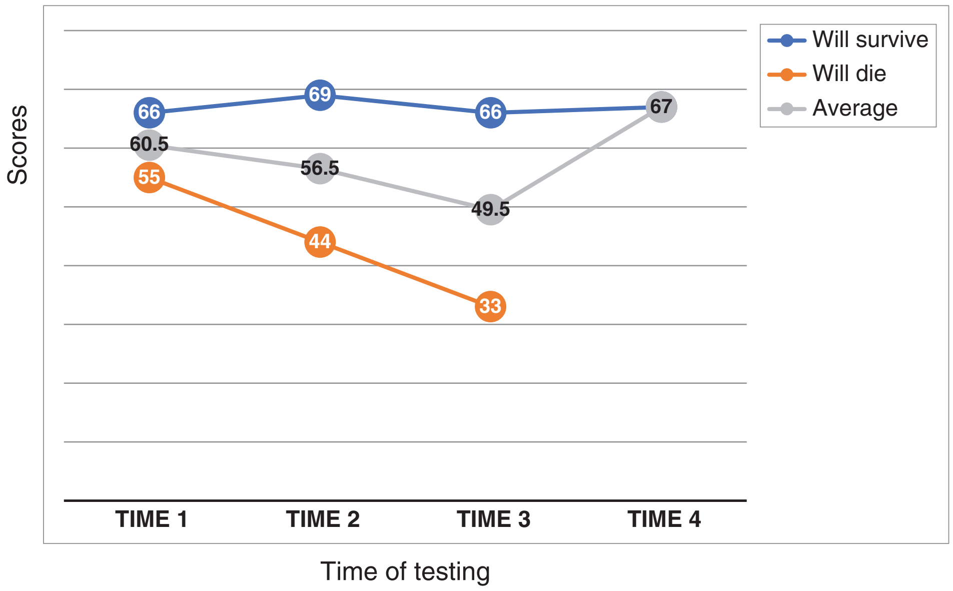
To address the problem, longitudinal researchers typically conduct analyses to determine whether the pattern of participant dropout was random, or whether it reflected a systematic bias that kept the healthier and more motivated participants in the sample.

Various statistical techniques are employed to determine whether non-random sampling has occurred, and if so, whether relationships between the variables are affected. Without such procedures, the study's results become difficult to interpret. Beyond a certain point, however, there is little that the researcher can do. The healthiest individuals will always be the last ones standing at the end of a study, and therefore may never have been representative of their age group (Hofer & Sliwinski, 2006). In fact, we know that the super centenarians studied in the New England Centenarian Study not only lived longer than their age peers who did not survive but also were remarkably healthy for their age (Sebastiani & Perls, 2012).

Practice effects are another theoretically thorny issue that complicate longitudinal studies (Hoffman et al., 2011). Because they repeatedly take the same tests, participants may improve simply because they become better able to answer the questions.

FIGURE 3.2

Effect of Selective Attrition in a Longitudinal Study



Longitudinal studies suffer from the problem of selective survival. Participants who will die before Time 4 had a steeper decline between Times 2 and 3 than those who will survive. The average seems to have increased between Times 3 and 4 because those who died were no longer in the sample; however, those who will survive show no actual change in scores.

If the test measures intelligence, as hard as this might seem to believe, the highly motivated participants may purposely learn the answers in between testing occasions. Similarly, in studies examining personality, a participant may suspect or find out the meaning of a response that implies something unfavourable. On the next test occasion, the respondent may be less likely to respond honestly so as to avoid appearing to have unfavourable qualities.

The investigator faces a far more serious dilemma with regard to the nature of the tests themselves, which, over time, may become outdated. The cutting-edge theory developed in the 1980s may have since been refuted, but the researcher is still left with measures based on that theory. One way to address this problem is to reanalyze or rescale the test scores to correspond to the newer theory, if possible. This was the strategy used in studies of personality development by researchers at the Institute for Human Development in Berkeley, California, who began a study of child development in the late 1920s, a project that continued far longer than initially planned. By the time participants were in their adult years, the original measures were no longer theoretically relevant. The researchers rescored the data using newer theoretical and empirical frameworks.

A variety of methods can also address the practical problems that researchers encounter when they conduct longitudinal studies. Most importantly, investigators need to monitor and maintain their databases of contact information. Administrative personnel whose job it is to retain study participants can maintain the “care and feeding” of the sample in between testing occasions. Research staff may send out greeting cards for holidays and birthdays, or update participants on study progress via newsletters and emails. Many longitudinal studies use websites to allow participants to engage interactively. Creating a personal touch encourages respondents to continue their involvement and also enables investigators to keep better track of moves, deaths, or email address changes.

The problem of having to wait years, if not decades, for results can also be partly overcome. Investigators often publish multiple studies from the same investigation, some of which may be spinoffs addressing slightly different research questions. They can also look at analyses based on measures taken at the same testing point that are not dependent on the longitudinal analyses.

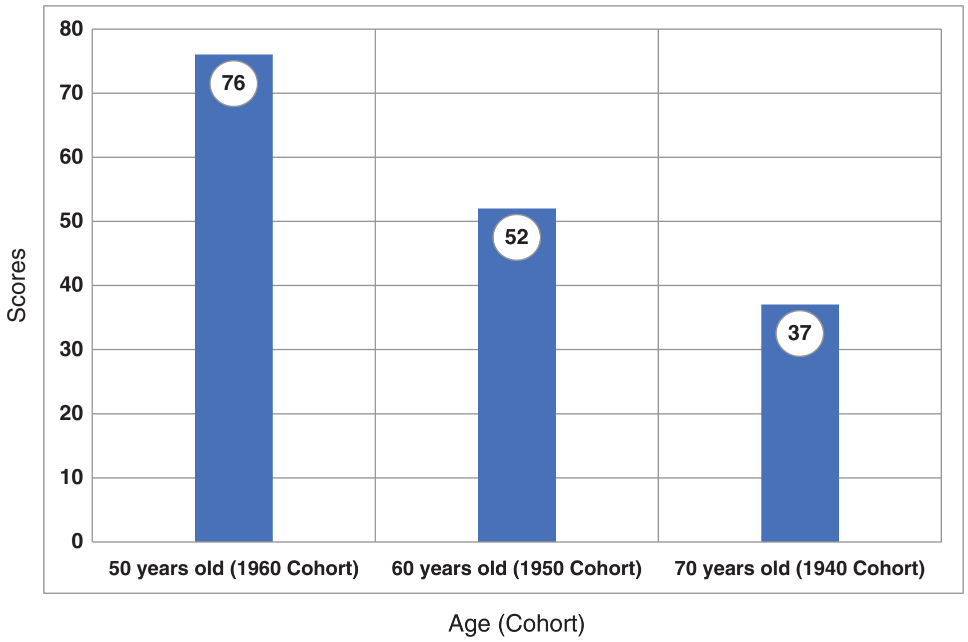
Despite their flaws, longitudinal studies have the potential to add invaluable data on psychological changes in adulthood and old age. Furthermore, as data accumulate from multiple investigations concerning related variables, a body of evidence builds up that helps to inform the larger research questions. Even though one study may have its problems, convergence across several investigations allows researchers to feel greater confidence when findings are similar from one study to the next.

Cross-Sectional Designs

In a study using a **cross-sectional design**, researchers compare groups of people with different ages at one point in time. Figure 3.3 illustrates a cross-sectional design of three cohorts carried out in the year 2010. The cross-sectional design is by far the more frequently used research method in the field of developmental science in general, but particularly in research on aging.

FIGURE 3.3

Sample Cross-Sectional Study



The design of a cross-sectional study showing the scores of three different age groups, who also represent different cohorts tested in 2010.

Because research on aging is focused on age *changes,* the cross-sectional design, which looks at *age differences*, would seem to hold limited value. However, given the expense, technical, and practical problems that plague longitudinal studies, many researchers have little choice but to turn to the cross-sectional method. It is then up to the researchers to come up with creative ways to control for those cohort effects, to make sure that they are actually studying the effects of age rather than simply documenting differences between cohorts.

The key to controlling for cohort differences is for researchers to select younger samples comparable in important ways to the older sample. For instance, in a study of aging and verbal memory, it would be important for researchers to ensure that the age groups being compared have similar vocabulary or verbal comprehension skills if not actually similar educational backgrounds.

The cross-sectional design reflects not only differences between cohorts, but also the effects of current social and cultural influences. In other words, everyone participating in the study at about the same time is affected by normative history-graded influences. For example, you and everyone else living now are going through the same events affecting your country, if not the world. What would make this even more problematic from the standpoint of studies on aging is if younger and older adults experience these events differently.

Researchers conducting cross-sectional studies must also control for cohort differences in factors related to the variable of interest on which the cohorts are being compared. Consider the data shown in Figure 3.3, displaying lower scores among the oldest cohort. If these scores were, for example, based on a test of health status, the researchers would need to ensure that the participants from the three age groups were drawn from similar social class groups. Based on Whitehall II, the study showing links between health and social class, such controls would be important to ensure that results attributed to age are not due to sociocultural factors.

Selective survival, the bane of longitudinal investigators, also serves to challenge the work of researchers whose primary work involves the cross-sectional design. Study participants, by definition, are survivors of their respective age groups. Thus, they may represent a healthier or luckier group of people than those in their cohort who did not live as long. Perhaps they are the ones who are more cautious, smarter, and genetically hardier and so were able to avoid the many diseases that could have caused their death prior to old age. As a result, older adults in a cross-sectional study may look different from the younger ones because the two groups are drawn from two different populations—those who will die young (but are still represented in the young adult group) and those who survive to be old. The sampling of young adults drawn exclusively from a university population, a common technique in psychological research, may not be representative of the younger cohort either.

Unlike a longitudinal study, however, cross-sectional studies do not lend themselves to examinations of terminal decline. Because the participants are not followed over time, deteriorations in performance as they become ill or impaired cannot be observed. It is possible that on any given occasion, a participant who will be dying in the next few months or years is in the sample of a cross-sectional study. However, this person's scores will not be tracked over time and so will not appear in the data.

Beyond these considerations, researchers conducting cross-sectional studies must make numerous decisions as they plan their sample. For example, if researchers wish to compare "young adults" with older adults, they have to decide whether to restrict themselves to the sort of typical 18- to 22-year range or instead allow the age range to expand to the mid- or even late-20s. As it turns out, the age range of older adult samples is rarely defined as narrowly as is the range of those in university. Often, researchers have to settle for an age range for the older group that is larger than is desirable. In some studies, the range is as large as 20 to 30 years (or more). Some researchers define the "older" sample as all respondents over the age of 50 or 60 and, having done so, fail to look for any possible age differences within the older sample. By the time all is said and done, age differences in the older sample may be as great, if not greater than, differences between the older and younger samples.

A problem related to the researchers' need to set acceptable age ranges is the question of how to divide samples when sampling the adult years. Is it better to divide samples of people in cross-sectional studies into decades and then examine age differences continuously across the adult years? Or is it better to compare people at the two extremes of the adult span? Researchers increasingly include middle-aged samples along with the younger and older adults rather than compare only those at the two extremes of the age distribution. The inclusion of three age groups creates a more justifiable basis for "connecting the dots" between their scores on measures of psychological functioning across the adult years.

Another area of concern to researchers conducting cross-sectional studies is the need to take into account the problem of task equivalence for the older and younger samples. Different age groups may very well react differently to the test materials, causing performance differences to be an artifact of the design. In studies of memory, for example, there is a risk that the older adults will find some of the measures challenging and perhaps intimidating because they are not used to having their abilities evaluated in a formal setting such as the psychology lab. Young adults are far more comfortable with test situations, because they either are currently or were recently in school, where testing is part of the fabric of everyday life. To an older adult, particularly one who is sensitive to memory loss, anxiety about the situation rather than actual performance can result in decreased scores, a topic we address further below.

Steve Buissinne/Pixabay

Research involving smartphone technology may make participation more difficult for some older adults, exaggerating any cohort differences.

Task equivalence also applies to the way different cohorts react to measures of personality and social attitudes. For example, a measure of depression may have been tested on a young adult sample but not on an older sample. Items on such a scale concerning physical changes, such as alterations in sleep patterns (a symptom of depression), may in fact reflect normal age-related differences and not differences in depression. Older adults will therefore receive a higher score on the depression scale by virtue of changing their sleep patterns alone, not because they are actually suffering from depression.

These problems aside, cross-sectional studies are relatively quick and inexpensive compared to longitudinal studies. Another advantage of cross-sectional studies is that the latest and most up-to-date technology can be brought to bear on the problem. If a new tool or technique comes out one year, it can be tested through a cross-sectional method the next. Researchers are not tied to obsolete methods that were in use some 30 or 40 years ago.

The best cross-sectional studies, though never able to permit causal inferences about aging, employ a variety of controls to ensure that differences other than age are kept to a minimum and that the ages selected for study span across the adult years. Most researchers regard their cross-sectional findings as tentative descriptions of the effects of aging on the function of interest. They are aware of the importance of having their findings replicated and verified through studies employing a longitudinal element.

Throughout this book, we endeavour to sift through the evidence and find the best available to report to you about the aging process. We will emphasize the studies that do the best job of controlling for factors extraneous to age, whether they are longitudinal or cross-sectional. The next section covers methods that are superior to descriptive designs; however, unfortunately, these methods are still only rarely used. In areas where there is relatively little research, we may find that we have to turn to studies that didn't necessarily control that well for confounds other than age. However, we will aim to point these problems out to you so that you are still getting the best information possible. Even if you do not pursue a research career, you will learn to be an educated consumer of research on this topic that is so vital to many areas of your life.

SEQUENTIAL RESEARCH DESIGNS

We have probably convinced you by now that the perfect study on aging is virtually impossible to conduct. Age can never be a true independent variable because it cannot be manipulated. Furthermore, age is inherently linked with time, and so personal aging can never be separated from social aging. However, considerable progress in some areas of research has been made through the application of **sequential designs**. These designs consist of different combinations of the variables age, cohort, and time of measurement. Simply put, a sequential design involves a "sequence" of studies, such as a cross-sectional study carried out twice (two sequences) over a span of 10 years. The sequential nature of these designs is what makes them superior to the truly descriptive designs conducted on one sample, followed over time (longitudinal design) or on different-aged samples, tested on one occasion (cross-sectional design). Not only do sequential studies automatically provide an element of replication, but when they are carried out as intended, statistical analyses can permit remarkably strong inferences to be drawn about the effect of age as distinct from cohort or time of measurement.

The Most Efficient Design

One of the most influential articles to be published in the field of adult development and aging was the landmark work by psychologist K. Warner Schaie (1965), in which he outlined what would later be called the **Most Efficient Design**, a set of three designs manipulating the variables of age, cohort, and time of measurement. It is "most efficient" because it enables the most amount of information to be condensed into the most inclusive data framework.

The three designs that make up the Most Efficient Design and the respective factors they include are the **time-sequential design**, in which the data are organized by age and time of measurement, the **cohort-sequential design**, in which cohorts are compared at different ages, and the **cross-sequential design**, in which cohorts are examined at different times of measurement (the only design that does not specifically include age as a factor). Figure 3.4 illustrates the combination of factors included in each of the sequential designs.

As you can see, then, each sequential design involves arranging the data obtained from more than one cohort at more than one age and across more than one time period. Figure 3.5 shows the cohort-sequential design, in which each of three cohorts is investigated over three time points. The figure shows three differing patterns of change. If only one cohort were tested, as would be true in a longitudinal study, it would appear that either the scores went up with age, they were flat, and then increased, or were almost completely unchanged. Notice, also, that the design ignores the fact that the three time points come from different years of testing (e.g., for age 30, the data came from 1970, 1980, and 1990).

In the time-sequential design, shown in Figure 3.6, researchers examine the two factors of age and time of measurement. The bars reflect the scores of 30-year-olds tested in 1970, 1980, and 1990; 40-year-olds tested in 1980, 1990, and 2000; and 50-year-olds tested in 1990, 2000, and 2010. At each time of testing, there were age differences, but because those age groups had different times of birth, the findings could reflect cohort rather than age effects.

The cross-sequential design, illustrated in Figure 3.7, shows the findings displayed according to cohort and time of

FIGURE 3.4

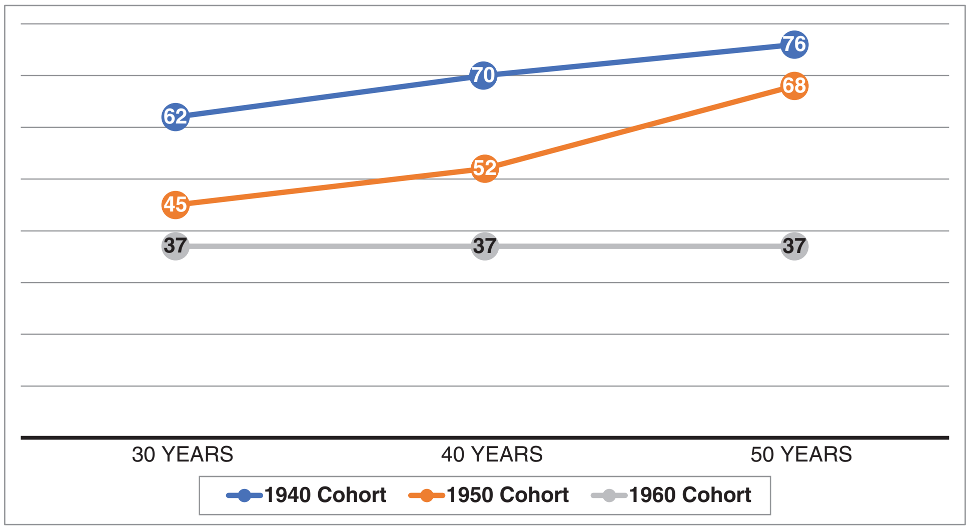
Factors Examined in Each of the Sequential Designs

	Age	Time	Cohort
Time-sequential	✓	✓	
Cohort-sequential	✓		✓
Cross-sequential		✓	✓

Each type of study in the "Most Efficient Design" involves different combinations of the factors of age, cohort, and time of measurement.

FIGURE 3.5

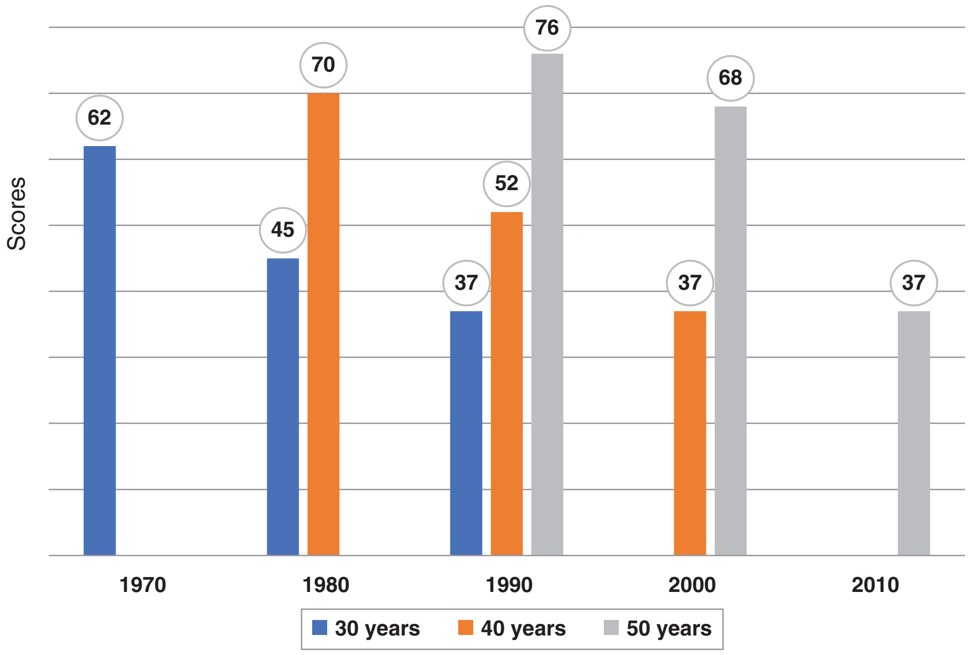
Sample Findings from a Cohort-Sequential Design



In a cohort-sequential design, two or more cohorts are followed across at least two different age periods. In this figure, the 1950 cohort is the only one to show increases from age 40 to 50, and the 1940 and 1960 cohorts have different mean scores at each age.

FIGURE 3.6

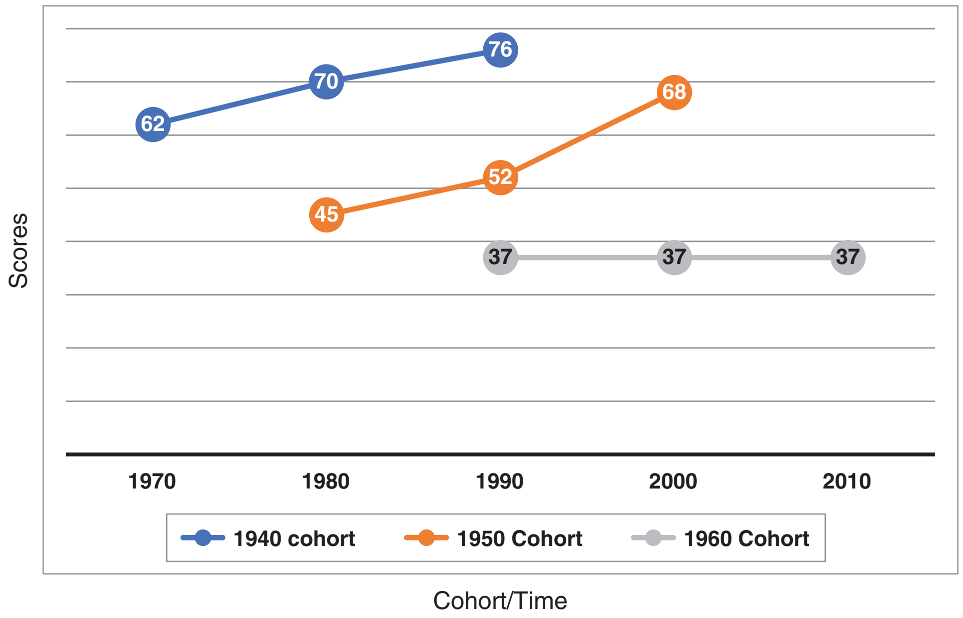
Sample Findings from a Time-Sequential Design



In a time-sequential design, scores are compared at different times of testing for groups that differ in age. In this figure, 50-year-olds had higher scores than the younger groups in 1990 and 2000. The 40-year-olds had higher scores in both 1980 and 1990.

FIGURE 3.7

Sample Findings from a Cross-Sequential Design



In a cross-sequential design, different cohorts are compared at different times of testing. In this figure, the 1960 cohort did not change over the three times of testing. The 1950 cohort showed increases, and the 1940 cohort was higher throughout from 1970 to 1990.

measurement and does not take age into account at all. The lines connect data points for each cohort across the three times of measurement. For the first two cohorts, there is a continuous rise in scores between 1980 and 1990, but the 1950 cohort increases between 1990 and 2000, while the 1960 cohort shows no change at all and has consistently lower scores.

The cross-sequential design suggests, then, that historical time does interact with age as an influence on patterns of scores. The time-sequential makes it possible to examine the effects of time of testing in contrast to age and the cohort-sequential to examine the effects of cohort. The interpretation the researchers make of these patterns of findings will be informed by the availability of evidence to tie scores on the scales of interest with those sociocultural, environmental, and historical factors. Keep these in mind as you read subsequent chapters, particularly where sequential data are available on the variables of interest.

CORRELATIONAL DESIGNS

The above developmental designs are all quasi-experimental, in that even in the sophisticated sequential approach, researchers are not able to manipulate the age of participants. An alternative approach to describing group differences using the quasi-experimental design is the **correlational design**, in which relationships are observed among variables as they exist in the world. The researcher makes no attempt to divide participants into groups or to manipulate variables.

Simple Correlational Designs

Comparisons of age groups or groups based on divisions such as year of birth or time of measurement are useful for many research questions in the field of gerontology. However, often this approach is neither the most efficient nor the most informative. By grouping people into categories, researchers lose a great deal of information that could be preserved if they used actual age in years. Age is a continuous variable, meaning that it does not have natural cutoff points as does a categorical variable such as gender. There may be a difference between people of 42 years of age and people of 49 years of age, but when they are all grouped in the "40-year-old" category, this distinction is obscured.

In the correlational design, age can be treated as a continuous variable and is therefore unnecessary or even desirable to put people into arbitrarily defined groups. The relationship between age and another variable is expressed through the statistic known as the **correlation** (represented by the letter *r*), whose value can range from +1.0 to –1.0. A significant positive correlation indicates that the two variables are positively related so that when the value of one variable increases the other one does as well. A significant negative correlation indicates that the two variables are negatively related so that when one increases in value the other one decreases. A correlation of zero indicates no relationship between the variables.

In a correlational study, the researcher makes no assumptions about what caused what—there are no "independent" or "dependent" variables. A correlation between two variables means simply that the two variables are related, but like the proverbial chicken and egg, the researcher cannot say which came first.

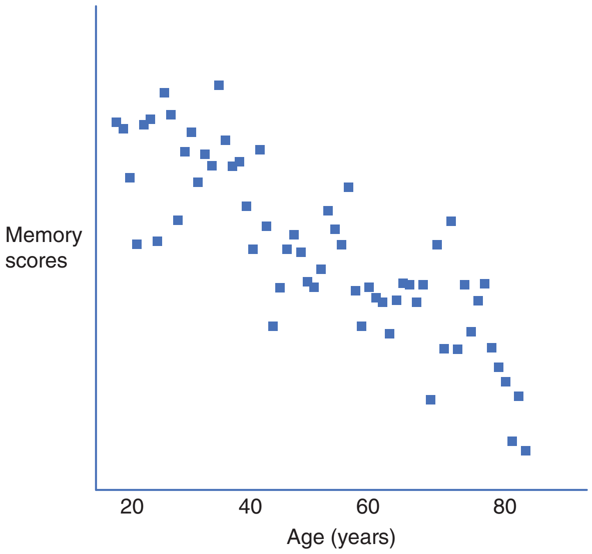
Consider the example shown in Figure 3.8 depicting the relationship between age and memory (a negative correlation). Each dot represents the score of one person in the study, and as you can see, people in the higher age range have lower memory scores than people in the lower age range. Although it would seem clear that higher age would "cause" poorer memory, rather than that poorer memory would "cause" aging, the age–memory relationship could reflect unmeasured variables such as health status, education, or even confidence in one's memory, all factors that we will examine in subsequent chapters. A simple correlational design does not make it possible to rule out these competing explanations.

When examining data from a typical correlational study, then, it is important to keep in mind that causation cannot be inferred from correlation and to be on the lookout for competing hypotheses related to unmeasured variables. Because arguments that increasing age "causes" changes in other variables are so compelling, it is difficult to remember that there can be other causes lurking in the background.

Correlational studies contain a wealth of information despite their inability to determine cause and effect. The value of the correlation itself provides a useful basis for calculating the strength of the relationship. Furthermore, it is possible to manipulate a larger number of variables at one time than is generally true in studies involving group comparisons. Advanced correlational methods have become increasingly available in the past 20 years

FIGURE 3.8

Sample Results from a Correlational Study of Age and Memory



Data from a memory study showing the performance of individuals ranging from 20 to 80 years of age, with each person's scores represented by a point on the graph.

that allow researchers to navigate the difficulties involved in causality with traditional correlational methods—we will turn to those next.

Multivariate Correlational Designs

In contrast to simple correlational designs, which involve determining the statistical relationship between two variables (called a bivariate relationship), a **multivariate correlational design** involves the analysis of relationships among more than two variables. Researchers using a multivariate design can simultaneously evaluate the effects of many potentially important factors, rather than being restricted to the study of two variables, which can lead to overlooking an important third (or fourth) variable.

Multivariate correlational methods also enable researchers to test models in which a set of variables is used to "predict" scores on another variable. In **multiple regression analysis**, one set of variables are designated as predictors of performance on another variable designated as the outcome.

A variant of multiple regression is **logistic regression**, in which researchers test the likelihood of an individual receiving a score on a discrete yes-no variable. For example, a group of investigators may want to test the probability that a person will receive a diagnosis of cardiovascular disease or not, depending on whether the person has one of several risk factors. Logistic regression is often used to determine whether non-random sampling has occurred, as discussed earlier with subject attrition in longitudinal studies. Using the yes-no variables of "survivor" and "dropout," researchers can attest to whether differences between survivors and dropouts are due to chance or to other factors.

Multivariate correlational designs have the potential to test complex models that reflect multiple influences, including age, on the outcome variables of interest to the researcher. For example, the researcher may believe that education positively affects life satisfaction in older adults because of a third variable, such as health status. The researcher can conduct a statistical test of **mediation**, in which the correlation between two variables is compared with and without their joint correlation to a third variable. If the correlation between education and life satisfaction is smaller when health status is included than when it is not, then the researcher can assume that health serves in this mediational role. Researchers can also test for **moderation**, when two variables are believed to have a joint influence on a third. For example, both age and education may separately relate to life satisfaction.

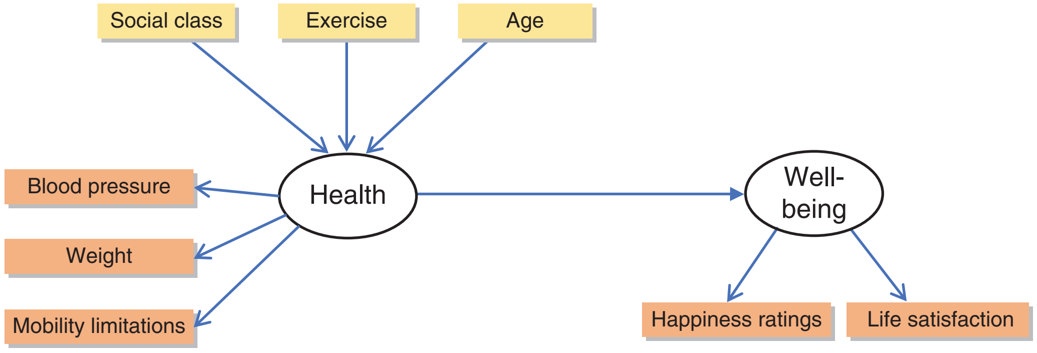
Researchers can test for multiple types of mediation and moderation by conducting a single analysis that includes different types of proposed relationships. In **path analysis**, researchers test all possible correlations among a set of variables to see if they can be explained by a single model. In our example of education, health, age, and life satisfaction, a path analysis would allow the researcher to test whether education and age both affect life satisfaction (moderation) through their joint effect on health (mediation), which in turn affects life satisfaction.

Depending on the data available to a researcher, there may be several measures that all tap a similar construct. In this case, they can use a **latent variable**, which is a statistical composite of several variables that were actually measured. In the example we are using, the researchers may have three measures of life satisfaction rather than just one. They can construct a latent variable that then serves to capture all three measures. In **structural equation modelling** (SEM), researchers test models involving relationships that include latent variables. As in path analysis, they propose a set of relationships among variables, but some are directly measured and others are constructed as latent variables.

Figure 3.9 shows an example of the results of a sample study using structural equation modelling to examine the predictors of life satisfaction from health, age, social class, and exercise frequency. Health is shown as a circle because it is a latent variable made up of the components of blood pressure, weight, and mobility limitations. Age, social class, and exercise frequency serve as additional predictors of the latent variable of health.

FIGURE 3.9

Structural Equation Modelling of Relationship between Health and Life Satisfaction



Data from a study using structural equation modelling to represent the relationship between health and well-being. Health represents a combination of blood pressure, weight, and mobility limitations. Well-being represents a combination of happiness ratings and life satisfaction. Social class, exercise, and age are all factors that can affect health

In the model, health is compared to these three additional variables in predicting the outcome of well-being.

SEM is typically used to assess the relationships among variables collected at one point in time. To take advantage of data obtained in longitudinal studies, researchers turn to a multivariate method that takes into account the patterns of people's scores over time. In **hierarchical linear modelling** (HLM) (Raudenbush & Bryk, 2002), individual patterns of change are examined over time rather than simply comparing mean scores of people at different ages. Such a technique is particularly important in longitudinal research, because not every participant exhibits the same patterns of change over time. While some individuals may increase, others may decrease, and some may not change at all. Solely looking at overall mean scores fails to capture this individual variation. In HLM, individual patterns can be explored statistically in addition to examining whether particular variables affect some individuals more than others.

TYPES OF RESEARCH METHODS

Data on adult development and aging can be captured using a variety of data collection strategies or research methods. Each method has advantages and disadvantages that are important to consider according to the particular field of study, the nature of the sample, available resources, and desired applications.

Laboratory Studies

The majority of information about physical and cognitive changes associated with the aging process comes from **laboratory studies**, in which participants are tested in a systematic fashion using standardized procedures. The laboratory method is considered the most objective way of collecting data because each participant is exposed to the same treatment, using the same equipment and the same data-recording procedures. For example, in a study of memory, participants may be asked to recall a set of items presented on a computer. At a later point, they may be asked to recall as many of those items as possible using some type of automated response system.

There are obvious advantages to the laboratory study. The objective and systematic way in which data are recorded provides the investigator with assurance that the results are due to the variables being studied rather than to extraneous factors. For instance, in the memory study, all participants would be presented with the recall items systematically, in a way that does not depend on the voice inflections of the researcher, the quality of the visual stimuli, or the amount of time used to present the items.

A limitation of the laboratory study is the inability to apply the stimuli presented to real-life experiences of most adults. It is possible that the older person feels uncomfortable when tested in an impersonal and possibly intimidating manner using unfamiliar equipment. Consequently, the findings may underestimate the individual's abilities in everyday life, and may not generalize to real-world scenarios.

Qualitative Studies

There are often instances in which researchers wish to explore a phenomenon of interest in an open-ended fashion. The investigation of social influences on adult development such as, for example, personal relationships, may demand that the researcher use a method that captures potentially relevant factors within a broad spectrum of possible influences (Allen & Walker, 2000). The **qualitative method** allows for the exploration of such complex relationships outside the narrow restrictions and assumptions of quantitative methods. In other cases, researchers may be working in an area in which conventional methods are neither practical nor appropriate for the problem under investigation. Qualitative methods are also used in the analysis of life history information, which is likely to be highly varied from person to person and not easily translated into numbers. The main advantage for using qualitative methods is that they provide researchers with alternative ways to test their hypotheses. The qualitative method can be adapted in a flexible manner to the nature of the problem at hand.

Archival Research

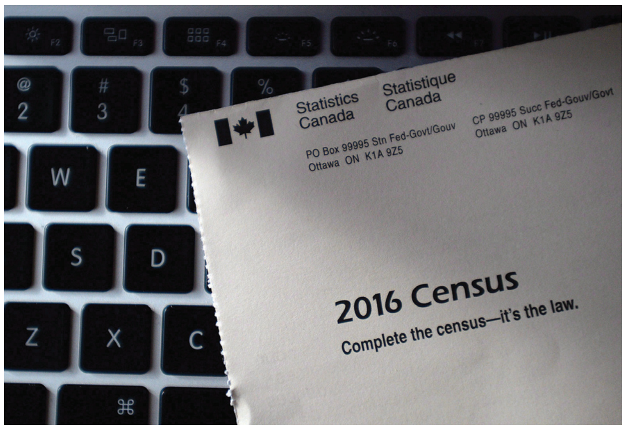
In **archival research**, investigators use existing resources that contain data relevant to a question about aging. The archives might consist of a governmental data bank, or the records kept by an institution, school, or employer. Another source of archival data is newspaper or magazine reports.

An advantage of archival research is that the information is readily accessible, especially given the growth of web-based data sets, including those from Statistics Canada. Data files can be downloaded directly from the Internet, or publications can be accessed using portable document files (PDFs) that are easily read and searched. Disadvantages are that the researcher does not necessarily have control over the form of the data. For instance, a governmental agency may keep records of employment by age that do not include information on specific occupations of interest to the researcher. Another disadvantage is that the material may not be systematically collected or recorded. Newspaper or school records, for example, may have information that is biased or incomplete.

Surveys

Researchers rely on the **survey method** to gain information about a sample that can then be generalized to a larger population. Surveys are typically short and easily administered with simple rating scales to use for answers. For instance, surveys are given to poll voters on who they will be casting their ballots for in upcoming elections. Occasionally, more intensive surveys may be given to gain in-depth knowledge about aging and its relationship to health behaviours, health risks, and symptoms. The Census of Canada was collected through survey methodology. However, it is considered archival in that it has extensive historical records going back to the year 1871, when the first national Canadian Census was conducted.

Statistics Canada conducts a census every five years, most recently in 2016. Topics include Canada's population, resources, economy, society, and culture. In addition, there are approximately 411 active surveys pertaining to many aspects of life in Canada. Statistics Canada has multiple stakeholders that make use of the data collected, including the Canadian public and media, government, businesses, labour unions, the academic sector, and foreign and international bodies. Of particular relevance to aging are the Canadian Community Health Surveys that provide data on the health and well-being of all Canadians. For example, results from the 2012 Canadian Community Health Survey found that one in six Canadians said they needed mental health care in the year prior to the survey. These survey data also revealed that adults aged 65 and older had the lowest rates of all mental health problems. These data are important for many reasons and have many uses, including comparing health and mental health status across age groups, information that is pivotal for allocating resources and policy-making (Statistics Canada, 2013a).


Statistics Canada
Statistique Canada
PO Box 99995 Stn Fed-Govt/Gouv
Ottawa ON K1A 9Z5
CP 99995 Succ Fed-Gouv/Govt
Ottawa ON K1A 9Z5
2016 Census
Complete the census—it's the law.

Data from the 2016 Canadian Census are collected through survey methodology; the results become archived and available for historical analyses.

Surveys have the advantage of providing data that allow the researcher to gain insight into the behaviour of more people than it would be possible to study in the laboratory or other testing site. They can be administered over the telephone or, increasingly, via the Web. Interview-based surveys given by trained administrators provide knowledge that is easily coded and analyzed while still providing comprehensive information about the behaviour in question. On the other hand, many surveys tend to be short, with questions that are subject to bias by respondents, who may attempt to create a favourable impression in the researcher (e.g., "How happy are you?"). Consequently, although the data may be generalizable to a large population, the quality of the data itself may be limited.

However, surveys also offer the opportunity to gather data on far larger samples than would be possible in the laboratory. As noted in Chapter 1, the Canadian Longitudinal Study on Aging (CLSA) will survey approximately 50,000 Canadians between the ages of 45 and 85 every 3 years for at least 20 years. The interdisciplinary nature of the CLSA, the fact that it has a longitudinal component, and its inclusion of the mid-life years will make it an important data source for studies spanning such wide-ranging areas as genetics, personality, mental and physical health, and sociodemographic factors. It will be ideal for employing sophisticated research designs, such as Schaie's Most Efficient Design, and will lead to new discoveries about the complex nature of the aging process.

Epidemiological Studies

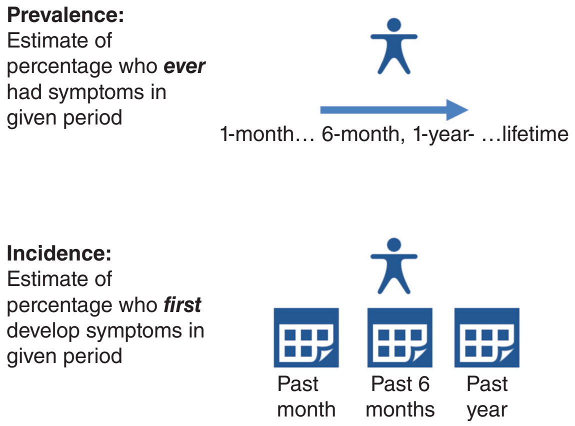
Governments, funding agencies, or interested researchers often need to gather data on the frequency of a particular disease in the population. **Epidemiology** is the study of the distribution and determinants of health-related states or events (including disease), and the application of this study to the control of diseases and other health problems.

An epidemiological study may use survey methodology in which questionnaires asking about a particular disease or set of diseases are sent to a representative sample of the population. Epidemiologists may also collect data through interviews and, increasingly, by obtaining biological samples for genetic and genomic analysis.

The results of epidemiological studies can provide researchers with two types of population estimates as shown in Figure 3.10. **Prevalence statistics** provide estimates of the percentage of people who have *ever* had symptoms in a particular period. **Incidence statistics** provide estimates of the percentage of people who *first* develop symptoms in a given period. For example, the lifetime prevalence of a disorder signifies what percentage of the population had the disease at any time since they were born. A one-year incidence estimate would tell you what percentage of the population develop symptoms of the disease within a one-year period.

FIGURE 3.10

Types of Data Used in Epidemiological Studies


Prevalence:
Estimate of percentage who ***ever*** had symptoms in given period
1-month… 6-month, 1-year- …lifetime
Incidence:
Estimate of percentage who ***first*** develop symptoms in given period
Past month
Past 6 months
Past year

Epidemiological studies are based either on prevalence or incidence data.

Case Reports

When researchers want to provide an in-depth analysis of particular individuals, they use the **case report**, which summarizes the findings from multiple sources for those individuals. Data may be integrated from interviews, psychological tests, observations, archival records, or even journal and diary entries. The focus of the case report is on the characteristics of the individual and what has influenced his or her development and life experiences. Personal narratives may also be obtained with this method, in which individuals describe their lives as they have experienced them and provide their ideas about why their lives have evolved in a given manner.

Although the case report has the benefit of providing insights into the lives of individuals as they change over time, it relies heavily on clinical judgements by the researcher. Therefore, for a case report to provide valuable information, a high level of expertise is required to ensure that the findings are presented in a manner that balances the objective facts with the subjective analysis of the researcher.

Focus Groups

A less formal research method is a **focus group**, which is a meeting of a group of respondents oriented around a particular topic of interest. In a focus group, an investigator attempts to identify important themes in the discussion and keep the conversation oriented to these themes. The goal is to develop concrete research questions to pursue in subsequent studies. For example, attitudes towards mental health providers among older adults may be assessed by a focus group in which participants 65 and older share their concerns and experiences with counsellors and therapists.

An advantage of the focus group is that issues can be identified through a focus group prior to conducting a more systematic investigation. This approach, often considered a pilot study, is particularly useful when little pre-existing research on the topic is available. An obvious disadvantage is that the method is not particularly systematic, and the data cannot readily be analyzed or systematically interpreted.

Daily Diaries

Researchers who wish to examine the day-to-day variations in a measure of interest use the **daily diary method** in which participants enter data on a daily basis. The data may consist of ratings on such variables as happiness, perceived stress, or interactions with friends, family, or coworkers. The participants may be asked to record their ratings at the same time every day, or they may be sent messages on a mobile device reminding them to enter their data. Typically, these studies are carried out over a period of weeks or months.

By obtaining data on a frequent basis over a period of time, researchers can track small variations in conditions that they believe may influence people's day-to-day functioning. Moreover, the statistical analyses made possible by these numerous data points provide researchers with more extensive information than they could obtain by single-point investigations.

Observational Methods

In the **observational method**, researchers draw conclusions about behaviour through careful and systematic examination in particular settings. Recordings may be made using videotapes or behavioural records. In one type of observational method known as participant-observation, the researcher participates in the activities of the respondents. For example, a researcher may wish to find out about the behaviour of staff in a nursing home. The researcher may spend several days living with people in the nursing home. The researcher's subjective experiences would become part of the "data."

There are elaborate procedures available for creating behavioural records in which the researcher precisely defines the behaviour to be observed (the number of particular acts) and specifies the times during which records will be made. Figure 3.11 shows a sample of a behavioural observation record.

This procedure may be used to determine whether an intervention is having its intended effects. For example, if an investigator is testing a method to reduce aggressive behaviour in people with Alzheimer's disease, behavioural records could be made before and after the intervention is introduced. After observing the effects of the intervention, the method's effectiveness could be determined by a return to the baseline condition to assess whether the aggressive behaviour increases without the intervention.

Meta-analysis

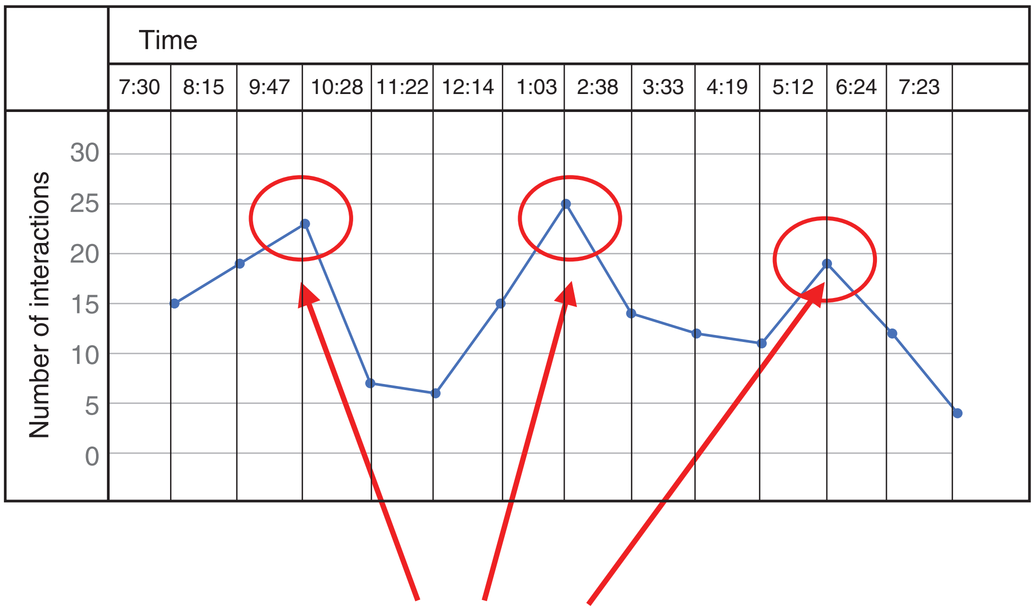
In comparing the findings across investigations that examined similar phenomena, researchers can take advantage of **meta-analysis**, a statistical procedure that allows them to combine findings from independently conducted studies. For example, it is common for multiple researchers to test the effect of a particular psychological treatment such as psychotherapy. The investigator who conducts the meta-analysis sets criteria for including particular studies, such as the type of therapy, use of similar outcome measures, and gender distribution of the sample. Then the investigator calculates a statistic that reflects the extent of the therapy's effect, known as the "effect size." This statistic can then be used to estimate, across studies, the statistical significance of the outcomes observed in the studies included in the analysis.

Studies on aging also benefit from meta-analysis. In these cases, investigations that include estimates of age differences or age changes can then be compared using a single statistic. That statistic then provides an estimate that incorporates all the studies that the researcher includes.

Meta-analysis is far superior to the approaches previously used, in which researchers would have no statistical basis for comparing one study with another. Although somewhat rare at this point in the field, with the accumulation of more research investigating similar problems, meta-analyses may become more

FIGURE 3.11

Behavioural Observation Record



In behavioural observations, researchers count the number of behaviours shown at given intervals.

pavelyar105/123 RF

In a behavioural observation study, researchers collect data by counting the frequency of specific behaviours.

common and therefore provide a more accurate picture of how a given variable or set of variables changes over the adult years.

MEASUREMENT ISSUES IN ADULT DEVELOPMENT AND AGING

Research designs, no matter how cleverly engineered, are unable to yield worthwhile results if the methods used to collect the data are flawed. Researchers in adult development and aging, like all other scientists, must concern themselves with the quality of the instruments they use to capture data. The task is made more difficult because the instruments must be usable with people who are likely to vary in ability, educational background, and sophistication with research instruments. Earlier we pointed out the problems involved in comparing older and younger adults on measures used in cross-sectional studies. Here we will look specifically at some of the ways developmental researchers can ensure that their measures are equivalent across age groups.

The first measurement issue to consider is that of **reliability**. A measure is reliable if it yields consistent results every time it is used. Reliability can be assessed by test-retest reliability, which is determined by giving the test on two occasions to assess whether respondents receive similar scores across both administrations. Another form of reliability relates to internal consistency, which indicates whether respondents answer similarly on comparable items. Inter-rater reliability refers to the degree to which two ratings are the same. This is particularly important, for example, in the area of diagnostic agreement, where independent professionals should agree on the mental health symptoms they are observing in a client.

The second criterion used to evaluate a test is **validity**, meaning that the test measures what it is supposed to measure. A test of intelligence should measure intelligence, not how good your vision is. Validity is a much more difficult quality to capture than reliability, particularly for concepts that are more difficult to define and operationalize, such as wisdom.

The concept of validity varies depending on the intended use of the measure. Content validity provides an indication of whether a test designed to assess factual material accurately measures that material. Your next exam may very well include questions testing how well you have understood the topics covered in this chapter. Criterion validity indicates whether a test score accurately predicts performance on an indicator

TABLE 3.1

Features of the Tri-Council Policy Statement

Informed consent	Debriefing and follow-up	Fairness and equity in research participation	Right to withdraw	Confidentiality of data
Participants are aware of study procedures, risks, and benefits	Information is provided at the study's completion about its true purpose and resources are provided to participants who may need them	Ensure that participation is not a burden for some groups and that other groups are not unfairly excluded	Participant can withdraw without penalty	Participant will not be identifiable in published reports and data will be securely stored

Source: Adapted from Canadian Institutes of Health Research, Natural Sciences and Engineering Council of Canada, and Social Sciences and Humanities Research Council of Canada. (2018). *Tri-council policy statement: Ethical conduct for research involving humans*. Retrieved from pre.ethics.gc.ca/pdf/eng/tcps2/TCPS_2_FINAL_Web.pdf

measure, as would be used in a test of vocational ability that claims to predict success on the job. Finally, construct validity is used to assess the extent to which a measure intended to assess a psychological construct is able to do so.

Construct validity is difficult to establish and requires two types of evidence: convergent and discriminant validity. Convergent validity is needed to determine that the measure relates to other measures that are of theoretical similarity. A test of intelligence should have a positive relationship to another test of intelligence that has been well validated. Discriminant validity demonstrates that the measure does not relate to other measures that have no theoretical relationship to it. A test of intelligence should not be correlated with a test of personality, unless the personality test assesses some aspect of intelligence.

Although psychologists are generally aware of the need to establish the reliability and validity of measures used in both research and practical settings, less attention is focused on psychometric properties when used in gerontological research. Measures whose reliability and validity were established on young adult samples are often used inappropriately without testing their applicability to samples of adults of varying ages. The process can become quite complicated. If Form A of a measure is found to be psychometrically sound with university students, but only Form B has adequate reliability and validity for older adults, the researcher is faced with the prospect of having to use different forms of a test within the same study.

ETHICAL ISSUES IN RESEARCH

All scientists who engage in research with humans or animals must take precautions to protect the rights of their participants. In extreme cases, such as in medical research, the life of an individual may be at stake if the individual is subjected to risky procedures. Research in which respondents are tested or put through stressful experimental manipulations also requires that standard protocols be followed. Recognizing the importance of these considerations, the Canadian Psychological Association developed a comprehensive set of guidelines for psychologists that governs all areas of practice that psychologists might engage in, including research. The *Canadian Code of Ethics for Psychologists* (Canadian Psychological Association, 2017) outlines four ethical principles: Respect for the Dignity of Persons, Responsible Caring, Integrity in Relationships, and Responsibility to Society. Each of these ethical principles has direct implications for research. For example, Respect for the Dignity of Persons includes protection for vulnerable persons, informed consent, freedom of consent, and the confidentiality of data. In addition, researchers must adhere to the guidelines set forth by the *Tri-Council Policy Statement: Ethical Conduct for Research Involving Humans*. This document was formulated by the three major Canadian granting agencies: the Canadian Institutes of Health Research, the Natural Sciences and Engineering Research Council of Canada, and the Social Sciences and Humanities Research Council of Canada (2018). We have summarized some of the main features of these guidelines in Table 3.1 and have discussed each in relation to doing research with older adults.

Researchers must present a potential respondent as full a disclosure as possible of the risks and benefits of becoming involved in any research project. When the individual is a minor or an adult who is not able to make independent decisions—for example, a person with dementia—the researcher is obligated to inform the individual's legal guardian about the nature of the study. Having provided information about the study, the researcher must then obtain a legal signature indicating that the participant understands the risks and benefits involved in the study. At this point, the researcher is able to obtain the full **informed consent** of the respondent or the respondent's legal representative. When the individual is an animal, the researcher is similarly bound to ensure that the animal is not mishandled or subjected to unnecessary harm, although different protective procedures are followed.

Although this may sound like a straightforward procedure, obtaining informed consent can be difficult when working with older adults with cognitive impairment. The foremost question is, Does the person have the capacity to fully understand the consent process, including details such as the purpose of the research, the expected duration and nature of participation, the research procedures, the potential risks and benefits, the voluntary nature of the participation, and the right to withdraw? This is related to the construct known as **capacity**, and research on this topic has grown significantly, extending to clinical, legal, and public policy domains (Moye et al., 2013). Capacity is a complicated construct, in part because it is context-dependent (i.e., individuals may have capacity to make simple decisions but lack capacity for more complicated decisions) and may be fluid (i.e., cognitive abilities may wax and wane over time). As noted in the *Guidelines for Psychological Practice with Older Adults* (American Psychological Association, 2014), people with dementia often have the ability to provide consent and, if they are no longer able to provide consent, may also assent to research. According to the Tri-Council Policy, "Many individuals who lack legal capacity may still be able to express their wishes in a meaningful way, even if such expression may not fulfill all of the requirements for consent" (2014, p. 45). In addition, consent forms that are developed and used by Institutional Research Boards often use language that is too difficult for older persons with limited education and/or cognitive impairment. Researchers must take special precautions with vulnerable older adults to protect their right to free and informed consent or assent.

Research participants are also entitled to know what the study was about after completion, in a process called **debriefing**. If you have ever participated in research, you may have been curious during the course of the study to know what was being tested. In some cases, you might have been surprised to find out about the "real purpose" you hear a loud noise in the hallway, followed by a man screaming. Although you may think the point of the study is to gather information about you through the questionnaires, the actual goal of the research was to find out whether you would offer help to the man in the hallway. After the experiment is over, the researcher is obligated to tell you the truth about the purpose of the study. You may be embarrassed if in fact you did not get up to help, but you at least had a right to know that you were being tested on this attribute. The debriefing might make you feel better if the experimenter explains that your behaviour was not all that atypical and, in fact, could be considered normal under such conditions. Even though the study's purpose was explained to you, it's still possible that you regret your failure to offer help to the man in distress. In fact, ethical guidelines for research in psychology dictate that the researcher not only provides feedback but also must be ready to suggest support or counselling for people who become distressed while involved in the experiment.

Respondents are also entitled to withdraw from a study without risk of penalty should they choose to do so. The experimenter should not coerce them into completing the study, and even if they decide to discontinue participation, they should still receive whatever reimbursement was initially promised. If they are students in a class or older adults in care settings (such as nursing home residents), they should not fear having their grades lowered or services withheld from them.

Finally, research participants are entitled to know what will happen to their data. In all cases, the data must be kept confidential, meaning that only the research team will have access to the information provided by the participants. The other condition usually attached to the data is that of anonymity. Participants are guaranteed that their names will not be associated with their responses. The condition of anonymity obviously cannot be kept if the study is a longitudinal one, because the researchers must maintain access to names for follow-up purposes. In this case, the condition of confidentiality applies, and the researchers are obligated to ensure that all records are kept private and secure.

Research with older adults poses specific challenges to ensuring confidentiality and anonymity. For example, when conducting research in some settings (e.g., nursing homes) it is difficult to find a private location to conduct research, and this could potentially compromise confidentiality. Moreover, meeting with a researcher in a public place, such as a nursing home, can violate the requirement of anonymity. Often, ethical boundaries such as who has access to what information are unclear in residential settings. This is also true for family members who may exert considerable control over older adults, particularly those who are dependent because of physical and/or cognitive impairment. Family members may not fully appreciate the need to maintain confidentiality and researchers may feel pressured to reveal sensitive information collected as part of the research process. Protecting older research participants from coercion from researchers, family members, or other individuals is vitally important. However, there are limits to confidentiality—for example, in cases where the older person is deemed to be at risk for harming him- or herself or others. These concerns are more likely to occur in research of a sensitive nature, such as studies on depression or suicide risk.

These ethical standards are enforced in all institutions receiving federal or local funding for research through Institutional Review Boards (IRBs), which review all proposed studies to be carried out at that institution or by anyone employed by that institution. The reviews ensure that the rights of research participants are adequately protected according to the criteria discussed above. In addition, the Canadian Psychological Association's ethical guidelines ensure that studies conducted specifically in the field of psychology meet predetermined criteria for protection of human and animal participants.

SUMMARY

1. The study of aging is intimately linked with the passage of time, making research on aging difficult to design and implement. A variable is a characteristic that "varies" from individual to individual. The dependent variable is the outcome that researchers observe, while the independent variable is the factor that the researcher manipulates. In experimental study designs, researchers decide on conditions that will allow them to manipulate a particular independent variable based on the question of interest, using random assignment. Because aging can never be randomly assigned, studies on aging are considered quasi-experimental.
2. Descriptive (single-factor) research designs include longitudinal and cross-sectional designs. Both are quasi-experimental because they do not involve the manipulation of age as an independent variable. Each has advantages and disadvantages, but the main problem is that they do not allow for generalizations to be made beyond a single cohort or period of history.

3. The variables in developmental research are age, cohort, and time of measurement. Age represents processes going on within the individual, and cohort and time of measurement are regarded as measures of social aging. These three variables are interdependent, because as soon as two are known, the third is determined. Cohort effects refer to the social, historical, and cultural influences that affect people during a particular period of time.
4. Longitudinal research designs involve people being followed repeatedly from one test occasion to another in an attempt to determine whether participants have changed over time as a result of the aging process. A variant of longitudinal research is the prospective study, in which researchers sample from a population of interest before they develop a particular type of illness or experience a particular type of life event. Longitudinal designs have several limitations, including selective attrition, terminal decline, practice effects, outdated tests, and length of time to follow the results. A variety of methods can be employed to account for these limitations.
5. A cross-sectional design compares groups of people with different ages at one point in time and are the more frequently used method in research on aging. The challenge of cross-sectional designs is to ensure that the effects of age are studied rather than differences between cohorts. Researchers design cross-sectional studies to control for cohort effects as best as possible. Limitations of cross-sectional research include concerns about survival effects, unrepresentative populations, age range definitions, test material reaction, and task equivalence. Despite these drawbacks, researchers employ a variety of controls to ensure that differences other than age are kept to a minimum.
6. Sequential designs consist of different combinations of the variables age, cohort, and time of measurement and attempt to control for the effects of social aging by allowing researchers to estimate the influence of factors other than age on performance. The Most Efficient Design was developed by Schaie to provide a framework for three types of sequential studies and involves a set of three designs manipulating the variables of age, cohort, and time of measurement.
7. Correlational designs involve studying the relationship between age (or another variable) and other measures of interest. A simple correlational design involves two variables, and a multivariate correlational design involves analyzing relationships among multiple variables. Structural equation modelling is a form of multivariate correlational analysis in which complex models involving age can be statistically evaluated. In hierarchical linear modelling, patterns of change over time are analyzed, taking into account individual differences in change.
8. There are several methods of research available to investigators who study aging. In the laboratory study, conditions are controlled, and data are collected in an objective manner. Qualitative studies allow for exploration using an open-ended method. Archival research uses existing records, such as census data or newspaper records. Surveys involve asking people to provide answers to structured questions, with the intention of generalizing to larger populations. Epidemiologic studies gather data on the frequency of a particular disease in the population. Case reports are used to provide in-depth analyses of an individual or small group of individuals. Focus groups gather information about people's views on particular topics. Observational methods provide objective data on people in specific settings and under specific conditions. Meta-analysis allows for a statistical procedure that permits researchers to combine findings from independently conducted studies.
9. Researchers in adult development and aging must concern themselves with finding the most appropriate measurement tools available. The science of studying measurement instruments is known as psychometrics. Of particular concern is the need to establish the appropriateness of the same measurement instrument for adults of different ages. Reliability refers to the consistency of a measurement instrument, and validity assesses whether the instrument measures what it is intended to measure.
10. Ethical issues in research address the proper treatment of participants by researchers. Informed consent is the requirement that respondents be given adequate knowledge about a study's procedures before they participate. Debriefing refers to notification of participants about the study's real purpose. Respondents also have the right to withdraw at any time without penalty. Finally, respondents must be told what will happen to their data, but at all times the data must be kept confidential and anonymous. All research institutions in Canada are required by federal law to guarantee the rights of human and animal subjects.

4

Physical Changes

Plastic surgery is big business worldwide. Check out these 2018 facts from the International Society of Aesthetic Plastic Surgery!

AGEFEED

#top10facts

1. Total number of surgical procedures: 10.6 million.
2. Total number of non-surgical procedures: 12.7 million.
3. Most common surgical procedure: breast augmentation (18 percent of total surgeries, an increase of 6.1 percent from 2017 to 2018).
4. Most common non-surgical procedure: Botox® (48 percent of non-surgical procedures, an increase of 17 percent from 2017 to 2018).
5. Countries ranked by total number of procedures: the United States, Brazil, Mexico, Germany, India, Italy, Argentina, Columbia, Australia, and Thailand.
6. Country with the most surgical procedures: Brazil (most common procedures are breast augmentation, liposuction, abdominoplasty, eyelid surgery, breast lift).
7. Percent of total cosmetic procedures by gender: 87 percent women, 13 percent men. More younger men are getting body contouring procedures; older men are getting procedures such as Botox®.
8. Most common procedure by age group: breast augmentation (19 to 34), rhinoplasty (19 to 34), Botox® (35 to 50), liposuction or non-surgical fat reduction (19 to 34 and 35 to 50).
9. Recent trends in plastic surgery: Non-surgical body contouring using fat freezing, laser technology, or ultrasound energy. Body enhancements include buttocks implants, fat transfer, and vaginal rejuvenation surgery.
10. Canadians can be "medical tourists," seeking cheap cosmetic surgery in other countries. Health Canada indicates that there are serious health and financial risks associated with medical tourism.

In this chapter, we examine changes in the body, brain, and sensory systems throughout middle and later adulthood, all of which can interact with an individual's identity. People's feelings about themselves strongly reflect perceptions of their physical appearance and ability to do what they want with their bodies. Furthermore, reflecting the interactionist model of development, physical changes affect a person's behaviour, which, in turn, can modify the actions the individual takes to slow or modify those changes. As people experience mobility changes, for example, they may exercise less often, only making it more difficult to engage in the exercise that can benefit their overall physical functioning.

In accordance with the interactionist model, you will find that there are behaviours people can engage to prevent many age-related changes, or at least substantially slow them down. If you adopt these changes now, you can grow older more successfully regardless of your current age. Physical activity isn't always the remedy for age-related changes, but it certainly goes a long way towards minimizing their effects. If you're not doing so already, we hope this book will inspire you to consider incorporating exercise into your own daily routine.

In keeping with the biopsychosocial perspective, physical changes reflect the influence of social factors, including social class, gender, and income. These social factors in turn affect how people interpret changes in their physical functioning. For example, women in Western culture are socialized to care more about their appearance than are men. This means that women are more likely to feel negatively about themselves as they lose their so-called youthful "beauty." However, women may also be more likely to take measures to maintain their appearance, such as wearing face makeup with sunscreen, which has the added benefit of preventing harmful exposure to the environment.

Physical changes also interact with identity in important ways throughout adulthood. This adds the "psych" to the biopsychosocial model as applied to aging of the body. The way that people interpret age-related changes in their physical functioning can have significant influences on their sense of self.

APPEARANCE

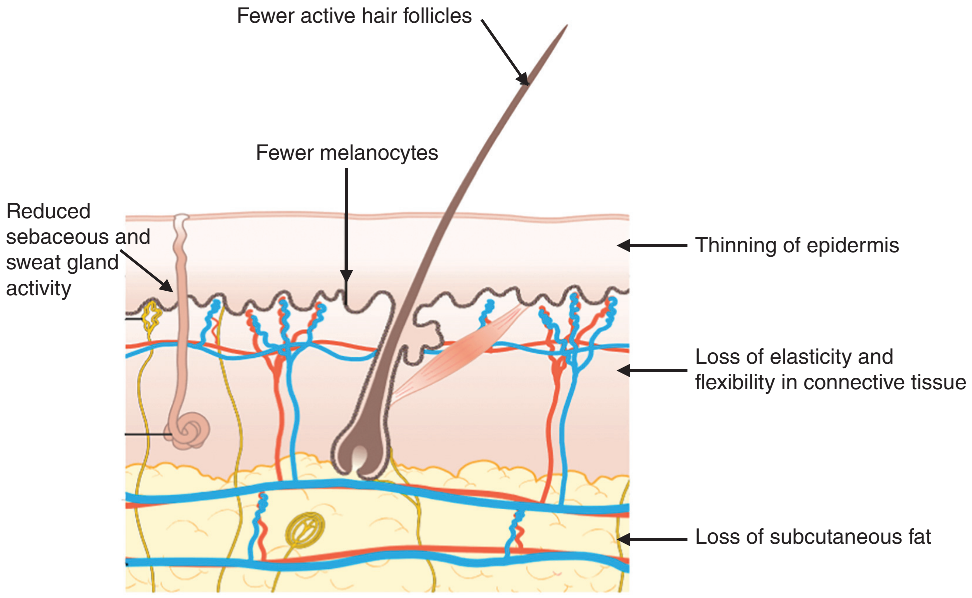
When you think about which physical changes are the most telling about the aging process, wrinkles and grey hair are probably the first changes that come to mind. Because people so commonly judge others by their appearance, even if not consciously, many adults regard these as the most important aspects of the changes that occur as they get older. Although there may not be a clear-cut relationship between observable and unobservable changes in the body, some researchers believe that the appearance you project to others could contain clues to the actual state of your health (Christoffersen & Tybjaerg-Hansen, 2016).

Skin

Skin, the largest organ in the body, is most vulnerable to a series of age-related changes that become visible as early as the 20s and continue throughout adulthood. Figure 4.1 summarizes the major age-related changes in the structures of the skin.

FIGURE 4.1

Age-Related Changes in the Skin


Fewer active hair follicles
Fewer melanocytes
Reduced sebaceous and sweat gland activity
Thinning of epidermis
Loss of elasticity and flexibility in connective tissue
Loss of subcutaneous fat

This diagram shows the major age-related changes in the structure of the skin.

The first signs of aging appear in the 30s and by the 50s, the skin shows distinctive marks of the passage of time. These changes are most apparent in the exposed areas of the skin, which include the face, hands, and upper arms.

The age changes that appear on the skin's surface reflect the changes that occur underneath. The outermost layer of the skin, known as the **epidermis**, consists of a thin covering that protects the underlying tissue. Over time, and not visible to the naked eye, the epidermal skin cells lose their regular patterning.

The **dermis** is the middle layer of the skin, made up of connective tissue, among which reside nerve cells, glands, and the hair follicles. Over time, the connective tissue in the dermis undergoes a set of changes due to changes in the two types of protein molecules of which it is composed. Collagen undergoes cross-linking, as we described in Chapter 2, leading the skin to become more rigidified and less flexible. Elastin, a molecule that is supposed to provide flexibility, becomes less able to return to its original shape after it is stretched during the person's movements. With the changes in collagen and elastin, the skin eventually can no longer return to its original state of tension and begins to sag. At the same time, the sebaceous glands, which normally provide oils that lubricate the skin, become less active. Consequently, the skin surface becomes drier and more vulnerable to damage from being rubbed or chafed.

The **subcutaneous** fat layer is the bottommost layer of skin, giving the skin its opacity and smoothing the curves of the arms, legs, and face. Starting in middle adulthood, this layer starts to thin, providing less support for the layers above it, which then exacerbates the wrinkling and sagging caused by changes in the dermis. The blood vessels beneath the skin therefore become more visible.

The skin's colouring also changes over the course of adulthood, most visibly in fair-skinned people. People develop discoloured areas referred to in colloquial terms as "age spots" (officially called *lentigo senilis*). These areas of brown pigmentation that show up on the skin of fair-skinned people are more likely to occur in the sun-exposed areas of the face, hands, and arms. Also developing on the skin are pigmented outgrowths (moles) and elevations of small blood vessels on the skin surface (angiomas).

The nails are a part of the skin and are also subject to age-related changes. Toenails, in particular, grow more slowly and may become yellowed, thicker, and ridged.

In addition to normal age-related changes in the nails, many older adults develop fungal infections in their toenails, causing the nails to thicken and separate from the nail bed. Older adults with limited joint movement and flexibility experience more difficulty in caring for their own feet and lower extremities (Mitty, 2009). Medications that older adults may be taking can also affect the hair, skin, and nails, further exacerbating changes due to the aging process.

The general changes that occur in the skin contribute to the aging of the face; however, the face's underlying structure also changes as a result of bone loss in the skull, particularly in the jaw. Changes in the cartilage of the nose and ears cause them to become longer, further altering the face's shape. The muscles of the face also lose their ability to contract, leading to a reduction in smiling width, particularly for males (Chetan et al., 2013).

Loss of enamel surface leads the teeth to become yellow as stains accumulate from a lifetime intake of coffee and tea, certain types of food, and—for smokers—tobacco. With increasing age, many people lose their teeth, a process which affects not only their appearance, but is also related to aspects of their health in general. In Canada, data from 2009 indicated that 21.7 percent of adults between the ages of 60 and 79 had no natural teeth. This percentage is significantly lower than in data from 1990, which showed that 43 percent of people in this age group had no natural teeth (Statistics Canada, 2015a). This is largely a result of the widespread use of fluorides in Canada and improved access to dental care, at least for those who can afford it. In Canada, 53 percent of adults between 60 and 79 years of age have no dental insurance, and this is a significant barrier to accessing dental services (Canadian Dental Association, 2017). Older adults in nursing homes are particularly disadvantaged in this regard. Nevertheless, some changes in the teeth are bound to occur, along with a rise in the associated prevalence of gum disease (Persson, 2018).

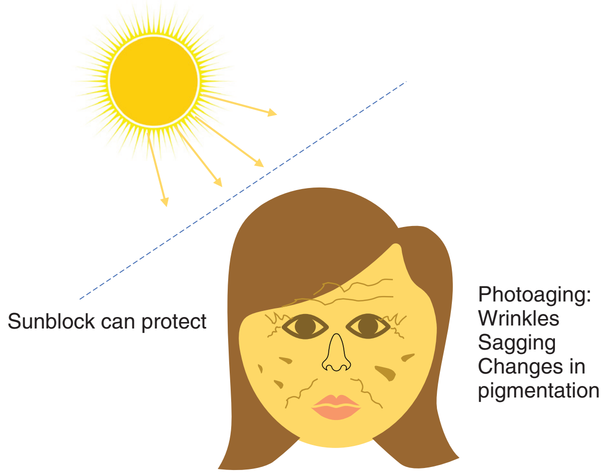
Changes in the skin also affect the appearance of the eyes, which develop bags, small lines at the creases (crow's feet), areas of dark pigmentation, and puffiness. The need for eyeglasses, which increases in middle adulthood as we discuss later in this chapter, means further changes.

Genetic background plays an important role in the rate of skin aging. Fair-skinned people tend to display more rapid effects of aging than those with darker skin. Above and beyond genetic inheritance, lifestyle habits are perhaps the next greatest influence on the aging of the skin. The most significant lifestyle habit is exposure to the sun. As shown in Figure 4.2, age-related changes in the skin due to radiation from the sun are called **photoaging** (Maddodi et al., 2012). The sun's ultraviolet rays accelerate the process of cross-linking, causing mutations that alter protein synthesis by the cells, and increasing the production of free radicals. Other harmful habits can interact with exposure to the sun, most notably cigarette smoke (Hodges & Walker, 2017).

This list of changes in the skin is indeed daunting. Many of these changes are intrinsic to the aging process, but even these vary depending on the individual's lifestyle habits. The most significant habit is the use of sunscreen to protect the skin from photoaging and skin cancer. Because it is not possible to avoid the sun's rays completely, people who want to protect themselves from photoaging and skin cancer should use sunscreen with a sun protection factor (SPF) of at least 15. The sunscreen should also block both UVA and UVB light. Though most health-conscious people are aware of the importance of sunscreen, they may not realize the importance of avoiding sunburn, as sunburn was reported by 33 percent of 53,130 respondents in the Canadian Community Health

FIGURE 4.2

Photoaging



Photoaging causes changes in the collagen and elastin molecules that contribute to wrinkling and sagging of the skin, as well as areas of discolouration due to changes in pigmentation.

Survey (Pinault & Fioletov, 2017). Higher rates of sunburn were reported among men, younger age groups, non-visible minorities, higher-income households, and the employed.

Additional ways to prevent skin aging involve the use of products that take advantage of improved micro delivery systems for ingredients such as collagen and tretinoin, the active ingredient in retinol (Ghate et al., 2016). Even so, not all anti-aging products are able to live up to their advertised promise, so it is best for consumers to do their research before buying expensive creams with no proven clinical effectiveness. The best type of moisturizer combines such active ingredients with SPF-15 and UVA/UVB protection. If used on a daily basis, a good moisturizer can help to counteract the fragility, sensitivity, and dryness of the exposed areas of skin. The addition of alpha-hydroxy acid agents to a basic moisturizer can help stimulate cell growth and renewal to offset sun damage (Tran et al., 2015).

Other anti-aging treatments for the face can only be provided by a plastic surgeon or dermatologist. The most popular is the injection of botulinum toxin (Botox®). In a Botox® treatment, a syringe containing a small amount of a nerve poison is injected into the area of concern, such as around the eyes or in the middle of the forehead muscle. This paralyzes the muscle, relaxing the skin around it and causing a temporary reduction in the appearance of the wrinkle. Although cosmetics companies have invested heavily in finding over-the-counter alternatives, at present there are no substitutes for this procedure.

Dermatologists and plastic surgeons perform a host of other anti-aging interventions: injections of artificial fillers, laser resurfacing treatments, and microdermabrasion. Increasingly, products that simulate these procedures are being introduced into the market; in the coming years, people who seek to reverse or alter the facial aging process will have a wider variety of affordable and convenient options.

Hair

You are most likely familiar with the fact that one of the most obvious changes to occur as the body ages is the greying of the hair. But what you might not realize is the fact that the hair does not, literally, turn grey. Instead, the number of pigmented (coloured) hairs diminishes over time, while the number of hairs that are no longer pigmented increases. Hair loses its pigment when the production of melanin, which gives hair its colour, slows and eventually ceases. It is very likely that by the time a person reaches the age of 75 or 80, there are virtually no naturally coloured hairs left on the scalp or other hair-covered areas of the body. There are variations in the rate at which this change takes place. You may have an older relative or friend whose hair is only slightly grey or, conversely, you may know people in their 20s who have a significant amount of grey hair already.

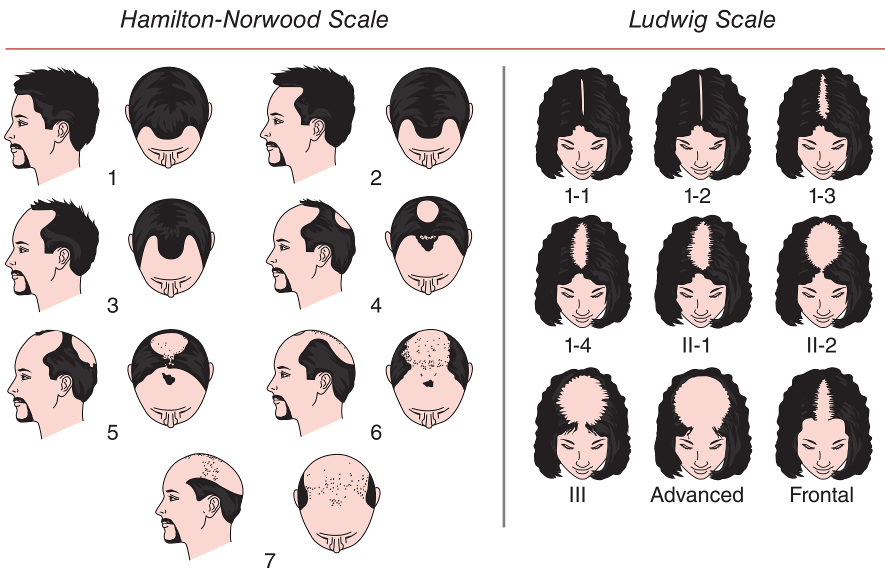
The thinning of the hair, though more visible in men, actually occurs in both sexes. In general, hair loss results from the destruction of the germination centres that produce the hair in the hair follicles. The most common form of hair loss with increased age is **androgenetic alopecia**, in which hair loss occurs according to a pattern, and is classified differently for men and women (see Figure 4.3). This is a condition that affects 95 percent of adult men and 20 percent of adult women, to some degree. Androgenetic alopecia causes the hair follicles to stop producing the long, thick, pigmented hair known as terminal hair and instead produce short, fine, unpigmented, and largely invisible hair known as vellus hair. Eventually, even the vellus hair is not visible, because it no longer protrudes from the follicle, which itself has shrunk. Although hair stops growing on the top of the head where it is desired, it may appear in larger amounts in places where it is not welcome, such as the chin on women, the ears, and in thicker clumps around the eyebrows on men.

Pharmaceutical companies are actively working to find a solution for baldness. The multitude of products designed to stop or mask the balding process range from chemicals applied directly to the scalp, most notably topical minoxidil (Rogaine), to herbal remedies and surgically implanted hair plugs. Available by prescription only, oral finasteride (Propecia) is another alternative considered to be effective against hair loss, although it has side effects that can interfere with a man's sexual functioning (Chiriaco et al., 2016).

Although there is no "cure" for grey hair or baldness, improvements in products that stimulate hair growth and the production of melanin are probably not far off in the future.

FIGURE 4.3

Forms of Male and Female Pattern Baldness



This figure shows the classifications of male and female pattern baldness which occur in androgenetic alopecia.

BODY BUILD

The concept of being “grown up” implies that you are done growing and your body has reached its final, mature form. However, throughout adulthood, the body is a dynamic entity, continuously changing in size and shape. By the time people reach their 50s and 60s, their bodies may have only a passing resemblance to what they looked like when they first reached physical maturity.

The first set of changes in body build involves height. Cross-sectional and longitudinal studies convincingly show that people get shorter as they get older, a process that is more pronounced for women. You may think of yourself as remaining for the rest of your life at the height, for example, of 5 feet 9 inches. However, the chances are good that you will lose as much as an inch in height over the coming decades. The decrease in height is due to the loss of bone material in the vertebrae. With the weakening of the vertebrae, the spine collapses and shortens in length (Videman et al., 2014).

The body’s shape also changes significantly for most people in the adult years. The lean tissue, or **fat-free mass (FFM)**, decreases. Countering this decrease is an increase in the **Body Mass Index (BMI)**, an index of body fat. The BMI is calculated by dividing weight in kilograms by height in metres squared. According to Health Canada, an ideal BMI is in the range of 18.5 to 24.9 (Health Canada, 2018a). As BMI increases so does the risk of developing health problems. Figure 4.4 shows the chart used to illustrate BMI in relation to your weight and height. Calculate your BMI by converting your weight into kilograms (2.2 kg = 1 pound) and height into centimetres (1 cm = 0.40 inch).

The overall pattern of body weight in adulthood shows an upside-down U-shaped trend by age. Most people experience an increase in their weight from their 20s until their mid-50s, after which they tend to lose those added pounds. The weight gain during middle adulthood is mainly due to an increase in BMI (Ding et al., 2007) representing the accumulation of body fat around the waist and hips (commonly referred to as the “middle-aged spread”). Unfortunately for most people, when they lose body weight in their 60s and beyond, it’s not due to loss of fat but to loss of muscle. Furthermore, the individual’s BMI when entering later life predicts loss of physical functioning and lean mass, with obese individuals showing the greatest patterns of decline (Reinders et al., 2015). Obese men had the highest risk of decline in physical function despite similar weight loss between trajectories, whereas overweight and obese women who lost the most weight had the greatest risk of lean mass loss.

The World Health Organization (2018f) has estimated that rates of obesity have tripled between 1975 to 2016. Even the average BMI in one of the lowest-BMI countries, Ethiopia, has increased from 19.8 to 21.3. The average BMI of Canadians increased over this period from 26.5 to 27.4 (World Health Organization, 2019b).

Much of the impact of aging on body build and composition can be offset by exercise. One 12-week study involving resistance training showed improvements in percent of body fat,

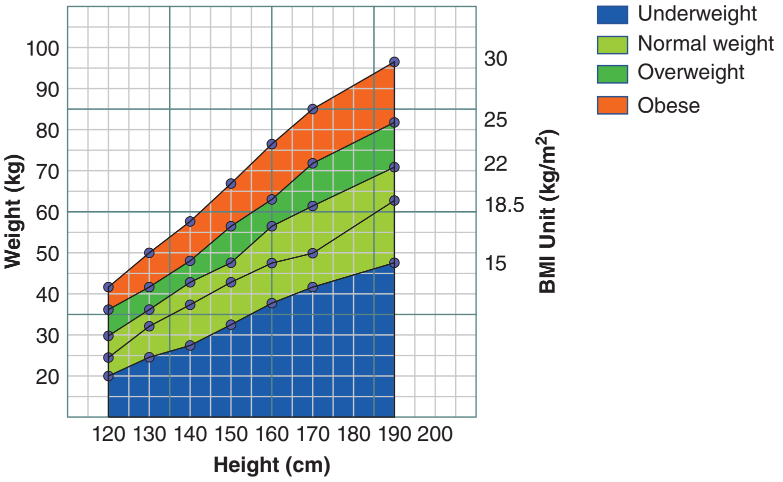


FIGURE 4.4

BMI Calculator

This chart can be used to obtain a rough calculation of BMI. Smartphone apps and online calculators are readily available to provide more precise estimates.

lean mass, and quadriceps strength, although the improvements in obese older adults were less favourable than normal-weight and overweight individuals (Geirsdottir et al., 2019).

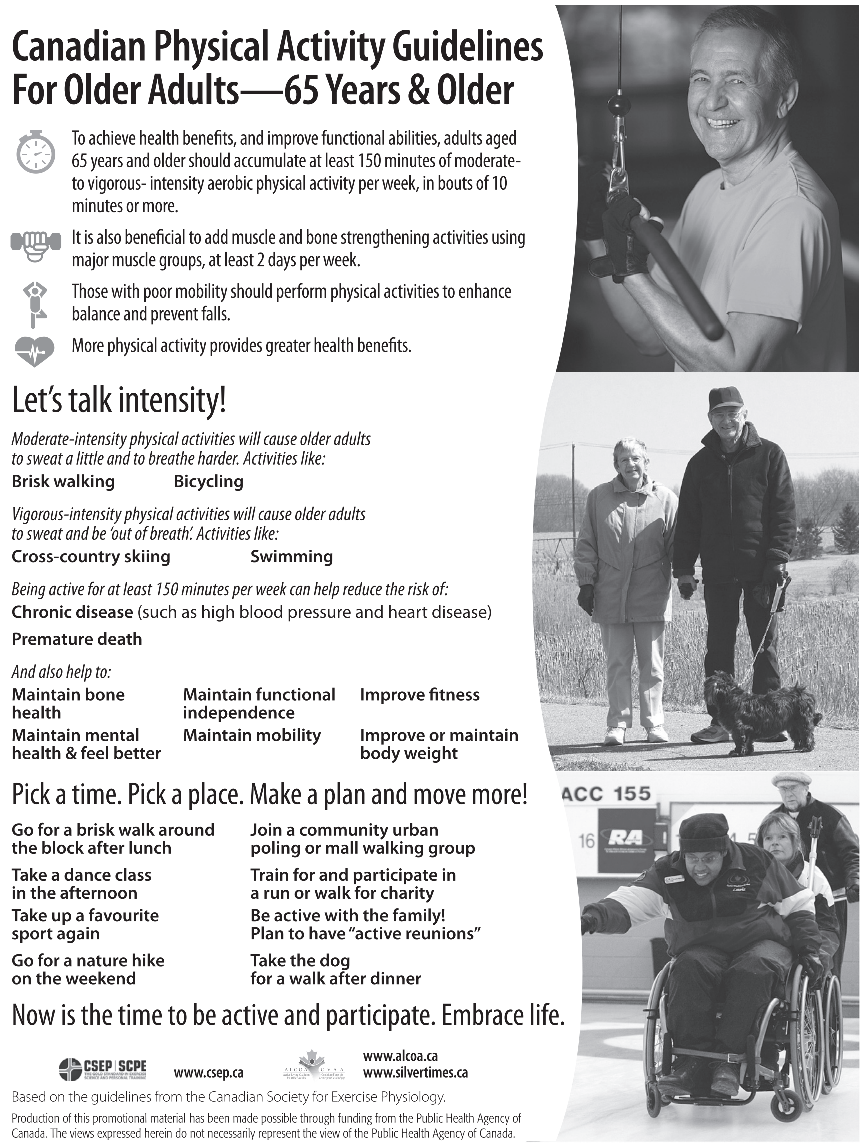
The Canadian Society for Exercise Physiology (CSEP) is a volunteer organization devoted to the scientific study of exercise physiology, exercise biochemistry, fitness, and health. In addition to publishing the academic journal *Applied Physiology, Nutrition, and Metabolism*, CSEP provides physical activity guidelines and toolkits for different ages and special populations (e.g., multiple sclerosis, spinal cord injury, Parkinson's disease).

Ariel Skelley/DigitalVision/Getty Images

Healthy exercise can keep adults functioning at optimal levels throughout their later years.

The CSEP guidelines suggest that adults aged 65 years and older should accumulate at least 150 minutes of moderate- to vigorous-intensity aerobic physical activity per week, in bouts of 10 minutes or more. In addition, they should engage in muscle- and bone-strengthening activities at least two days per week, and those with poor mobility should do exercises that will enhance balance and prevent falls. Even if the individual is unable to engage in the minimum amount of activity, he or she should perform some type of physical activities to avoid being sedentary. For example, older adults who have impaired balance and mobility can be given chair aerobics to perform, such as raising and lowering their arms. Individuals who have mobility problems or are frequent fallers can be given balance training that includes progressively more difficult postures, dynamic movements—such as turning in circles, heel stands, toe stands—and standing with their eyes closed. For those who are very sedentary, doing smaller amounts of exercise and gradually increasing the duration, frequency, and intensity, in consultation with a health care professional, will be important.

Exercise, even in small doses, can have beneficial effects not only on physiological status but also on feelings of psychological well-being. Recall our discussion at the beginning of the chapter on the interactions of aging and identity. One intriguing study provided dramatic support for this relationship. Researchers tested older adults on a measure of "social physique anxiety," the extent to which one is afraid of what other people think of one's body. Over the course of a six-month exercise training study, older adults decreased their social physique anxiety and felt more fit. They also gained on a measure of self-efficacy, or the feeling of confidence in being able to complete physically demanding tasks (McAuley et al., 2002). In a subsequent study, both social physique anxiety and confidence about one's appearance while exercising among sedentary, moderately obese women predicted their level of involvement in physical activity (Pearson et al., 2013).



Canadian Physical Activity Guidelines For Older Adults—65 Years & Older

To achieve health benefits, and improve functional abilities, adults aged 65 years and older should accumulate at least 150 minutes of moderate- to vigorous- intensity aerobic physical activity per week, in bouts of 10 minutes or more.

It is also beneficial to add muscle and bone strengthening activities using major muscle groups, at least 2 days per week.

Those with poor mobility should perform physical activities to enhance balance and prevent falls.

More physical activity provides greater health benefits.

Let's talk intensity!

Moderate-intensity physical activities will cause older adults to sweat a little and to breathe harder. Activities like:

Brisk walking **Bicycling**

Vigorous-intensity physical activities will cause older adults to sweat and be 'out of breath'. Activities like:

Cross-country skiing **Swimming**

Being active for at least 150 minutes per week can help reduce the risk of:

Chronic disease (such as high blood pressure and heart disease)

Premature death

And also help to:

Maintain bone health

Maintain mental health & feel better

Maintain functional independence

Maintain mobility

Improve fitness

Improve or maintain body weight

Pick a time. Pick a place. Make a plan and move more!

Go for a brisk walk around the block after lunch

Take a dance class in the afternoon

Take up a favourite sport again

Go for a nature hike on the weekend

Join a community urban poling or mall walking group

Train for and participate in a run or walk for charity

Be active with the family! Plan to have "active reunions"

Take the dog for a walk after dinner

Now is the time to be active and participate. Embrace life.

CSEP | SCPE www.csep.ca ALCOA www.alcoa.ca www.silvertimes.ca

Based on the guidelines from the Canadian Society for Exercise Physiology.

Production of this promotional material has been made possible through funding from the Public Health Agency of Canada. The views expressed herein do not necessarily represent the view of the Public Health Agency of Canada.

Courtesy Active Living Coalition

The Canadian Society for Exercise Physiology (CSEP) recommends these physical activity guidelines for older adults.

MOBILITY

You are able to move around in your environment due to the actions of the structures that support this movement, including your bones, muscles, tendons, and ligaments. In the average person, all of these structures undergo age-related changes that compromise their ability to function effectively.

Beginning in the 40s (or earlier in the case of injury), each component of mobility undergoes significant age-related losses. The changes in gait that occur in later adulthood include slowing, impaired balance and stability, lower extremity strength, and a fear of falling (Cruz-Jimenez, 2017). Foot problems alone affect 71 to 87 percent of the older adult population, leading to pain and limitations in the ability to carry out everyday activities (Rodriguez-Sanz et al., 2018). Consequently, people walk more slowly as they get older (Shumway-Cook et al., 2007), although they can make up for their slower gait by taking longer steps more frequently (Jerome et al., 2015). Barring this adaptation, older adults may find it hard to adapt to their slower walking speed, leading them to be more likely than the young to make mistakes when predicting how long it will take them to cross the street (Dommes et al., 2012). Thus, there are practical implications of these changes in mobility that can have far-reaching consequences on the older adult's life and health.

Recognizing the importance of mobility in aging, in 2005 the Canadian Institutes of Health Research (CIHR) launched the Mobility in Aging Initiative of the CIHR Institute of Aging. They provided funding to researchers and community partners in order to better understand a wide range of challenges to mobility for Canadian older adults, ranging from biological, physiological, and psychosocial factors to environmental factors—social, economic, policy, and physical. There was a

CIHR IRSC
Canadian Institutes of Health Research
Instituts de recherche en santé du Canada

The Canadian Institutes of Health Research (CIHR) is the Government of Canada's health research investment agency.

strong emphasis on knowledge translation—that is, getting the research results to those who need it most: older adults and those who work with and on behalf of older adults.

Muscles

The adult years are characterized by a progressive age-related loss of muscle mass with a consequent loss of strength, a process known as **sarcopenia**. The number and size of muscle fibres decrease, especially the fast-twitch muscle fibres that you use in speed and strength. As indicated by research from cross-sectional studies, muscle strength as measured by maximum force peaks in the 20s and 30s, remains at a plateau until the 40s to 50s, and then declines at a faster rate of 12 to 15 percent per decade (Kostka, 2005), with more pronounced decreases for men (see Figure 4.5).

In contrast to declines in their speed and strength, people retain their muscular endurance, as measured by isometric strength (Lavender & Nosaka, 2007). There are also relatively minor effects of age on eccentric strength, the action involved in such activities as lowering arm weights (such as the downward motion of a bicep curl) or going down the stairs. Eccentric strength is preserved through the 70s and 80s in men and women (Roig et al., 2010).

Changes in muscle mass strongly predict age-related reductions in strength in adulthood (Walston, 2012). The second contributor to loss of muscle strength comes from disrupted signals that the nervous system sends to the muscles telling them to contract (Clark & Fielding, 2012). Third, the tendons become stiffer, which makes it more difficult to move the joint and hence exert muscular strength (Carroll et al., 2008).

The loss of muscle mass brings with it a set of negative consequences, including increased risk of falling, limitations in mobility, and reduced quality of everyday life. Unfortunately, sarcopenia can become part of a vicious cycle; the greater the loss of muscle mass, the greater the difficulty the person experiences in undertaking exercise, leading to more muscle loss weakening (Lang et al., 2009). If sarcopenia occurs in the presence of gains in fat, a condition known as sarcopenic obesity may develop, in which the individual both loses muscle and gains body fat (Tyrovolas et al., 2016).

Strength training with free weights or resistance machines is the top preventative measure that can counteract the process of sarcopenia in adulthood (Nascimento et al., 2019). Although older adults do not achieve as high a degree of improvement as do younger adults, even a program as short as 16 weeks of resistance training can build fast-twitch muscle fibre numbers to the size of those found in the young (Negaresh et al., 2019). There seems to be no age limit to who can benefit, as adults in their 90s also show improvements in muscle strength after training (Kryger & Andersen, 2007).

Effective muscle strength training typically involves 8 to 12 weeks, three to four times per week, at 70 to 90 percent of the one-repetition maximum. In order for these benefits to be maintained, the individual has to keep exercising. It's not enough to exercise for a year or two and then stop. Resistance training also has added benefits for cardiovascular functioning by improving the ability of peripheral arteries to circulate blood (Parmenter, 2019).

One of the major benefits of muscle training is that the stronger the muscles become, the more pull they exert on the bones. As we will see next, loss of bone strength is an equally significant limitation on the health and well-being of older adults as is loss of muscle mass.

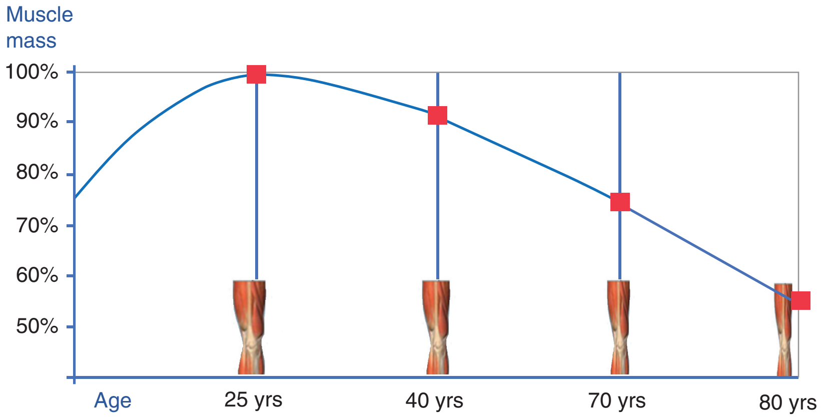


FIGURE 4.5

Sarcopenia in Relation to Age

Changes with age in muscle mass, or sarcopenia, occur gradually throughout adulthood.

sturti/iStock/Getty Images Plus/Getty Images

Weight training can counteract the process of sarcopenia.

Bones

Bone is living tissue. It constantly reconstructs itself through a process of **bone remodelling** in which old cells are destroyed and replaced by new cells. The general pattern of bone development in adulthood involves an increase in the rate of bone destruction compared to renewal and greater porosity of the calcium matrix, leading to loss of bone mineral content. The remodelling process that results in these changes is controlled in part by a set of protein-like substances that act on the bone cells (Cao et al., 2005). These substances are, in turn, under the influence of the sex hormones estrogen for women (Messier et al., 2011) and testosterone for men (Travison et al., 2009). Therefore, as people experience decreases in sex hormones, they also lose bone mineral content (Sigurdsson et al., 2006).

Estimates of the decrease in bone mineral content over adulthood are about 0.5 percent per year for men and 1 percent per year for women (Emaus et al., 2006), although the rates become higher for women in their 50s (3 to 5 percent per year; Ferrucci et al., 2016) (see Figure 4.6). Further weakening occurs as a result of microcracks that develop in response to stress placed on the bones (Diab et al., 2006). Part of the older bone's increased susceptibility to fracture can be accounted for by a loss of collagen, which reduces the bone's flexibility in response to pressure (Saito & Marumo, 2009). The problem is particularly severe for the upper part of the thigh bone right below the hip, which does not receive much mechanical pressure during walking and therefore tends to thin disproportionately (Mayhew et al., 2005).

In addition to genetic influences on bone loss (Ralston, 2007) are the effects of lifestyle factors including mobility and weight with obese sedentary individuals showing higher rates of bone loss (Shapses & Sukumar, 2012). The key lifestyle factors are to exercise (both aerobic and resistance), not smoke, and maintain a BMI of approximately 25 (Wilsgaard et al., 2009). Eating high amounts of dietary protein can further stave off bone loss (Devine et al., 2005) as can increasing calcium intake prior to menopause and taking vitamin D (Dawson-Hughes & Bischoff-Ferrari, 2007). Additional foods to include in the diet are sources of magnesium such as banana, certain types of nuts, and potato, as well as carotenoids found in carrot, squash, and apricot (Dawson-Hughes & Bischoff-Ferrari, 2007; Devine et al., 2005; Ryder et al., 2005; Sahni et al., 2009). Beginning

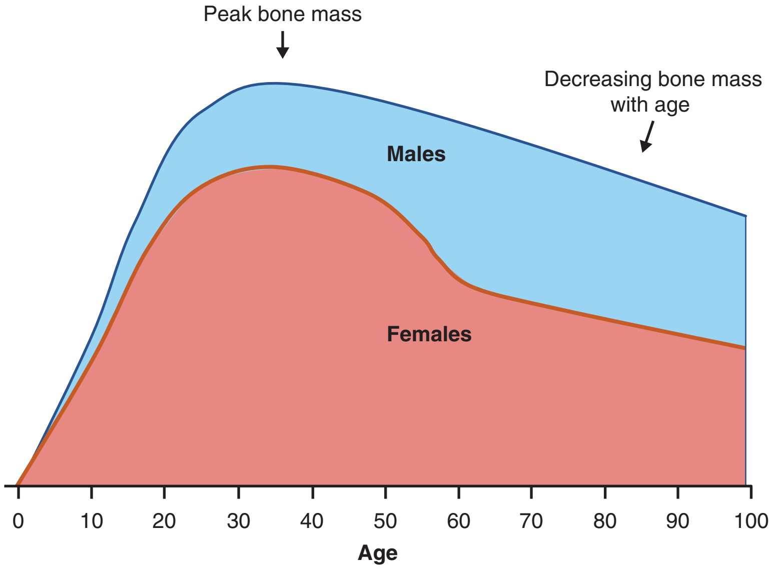


FIGURE 4.6

Bone Mineral Content in Relation to Age

Bone mass peaks in early adulthood for men and women, declining more abruptly for women due to changes associated with the menopause.

a program of resistance training prior to menopause is another important intervention that women can use to minimize bone loss after menopause (Ferrucci et al., 2016).

Environmental factors also play a role in maintaining bone health. People who live in climates with sharp demarcations between the seasons appear to be more likely to suffer from earlier onset of bone loss; for example, people living in Norway have among the highest rates of bone fracture of anyone in the world (Forsmo et al., 2005).

Not only can taking advantage of methods to reduce bone loss improve physical functioning and mobility, there is also evidence that people with stronger bones live longer. This mortality advantage remains even after controlling for other relevant health measures, including grip strength (Hauger et al., 2018).

Joints

Although most people do not feel that they are getting "creaky" until their 40s, the joints are already undergoing significant changes even before you reach the age of skeletal maturity in late adolescence. By the 20s and 30s, the articular cartilage that protects the joints has already begun to degenerate, and as it does so, the bones start to suffer as well. The fibres in the joint capsule become less pliable, reducing flexibility even further. Within the knees, at least, these changes have a greater impact on women beginning in their 40s (Ding et al., 2007).

Unlike muscles, joints do not benefit from constant use. On the contrary, stress and repeated use cause the joints to wear out more rapidly. As they become less flexible and more painful, people find it increasingly hard to move the affected limbs, hands, and feet.

As you will learn in Chapter 5, extreme joint pain and loss of mobility are associated with diseases that affect the musculoskeletal system, which become increasingly prevalent in later life.

Because joint pain is associated with overuse, individuals who wish to exercise to benefit other bodily systems must use caution (Nielsen et al., 2019). To protect the joints and take advantage of benefits of exercise on other bodily systems, it is best to work on strengthening the muscles that support the joints and increasing the flexibility of tendons and ligaments that allow the joints to move more comfortably (Reeves et al., 2006). Because the increased weight associated with obesity contributes to joint pain and stiffness and loss of cartilage volume (Teichtahl et al., 2009), an exercise program should also focus on lowering body fat.

One of the more interesting findings focuses on the deleterious effects of prolonged sitting, for example, on the computer, watching TV, and playing video games. The Canadian Centre for Occupational Health and Safety (CCOHS, 2020) provides information on the "Downside of Sitting on Our Backsides." The CCOHS reports many harmful effects of prolonged sitting, including disorders in blood circulation, musculoskeletal injuries, reduced heart and lung efficiency, digestive problems, and generally decreased fitness. Ergonomically designed workstations, shown in Figure 4.7, and repeated breaks are two ways of overcoming the negative effects of prolonged sitting, and, because these effects are cumulative over a lifetime, it's never too early to start!

VITAL BODILY FUNCTIONS

The major organs of the body that keep us alive are in the cardiovascular, respiratory, urinary, and digestive systems. Each of these systems undergoes age-related changes on their own. However, it is difficult to separate the systems completely due to interactions in their structures and functions that change across the adult years. At the same time, changes due to aging in each separate system can be modified by exercise, diet, lifestyle, and psychosocial factors.

Cardiovascular System

The cardiovascular system includes the heart, the arteries that circulate blood throughout the body away from the heart, and the veins that bring the blood back to the heart. The most significant changes in the cardiovascular system involve the heart muscle itself and the arteries, leaving the veins relatively spared (see Figure 4.8).

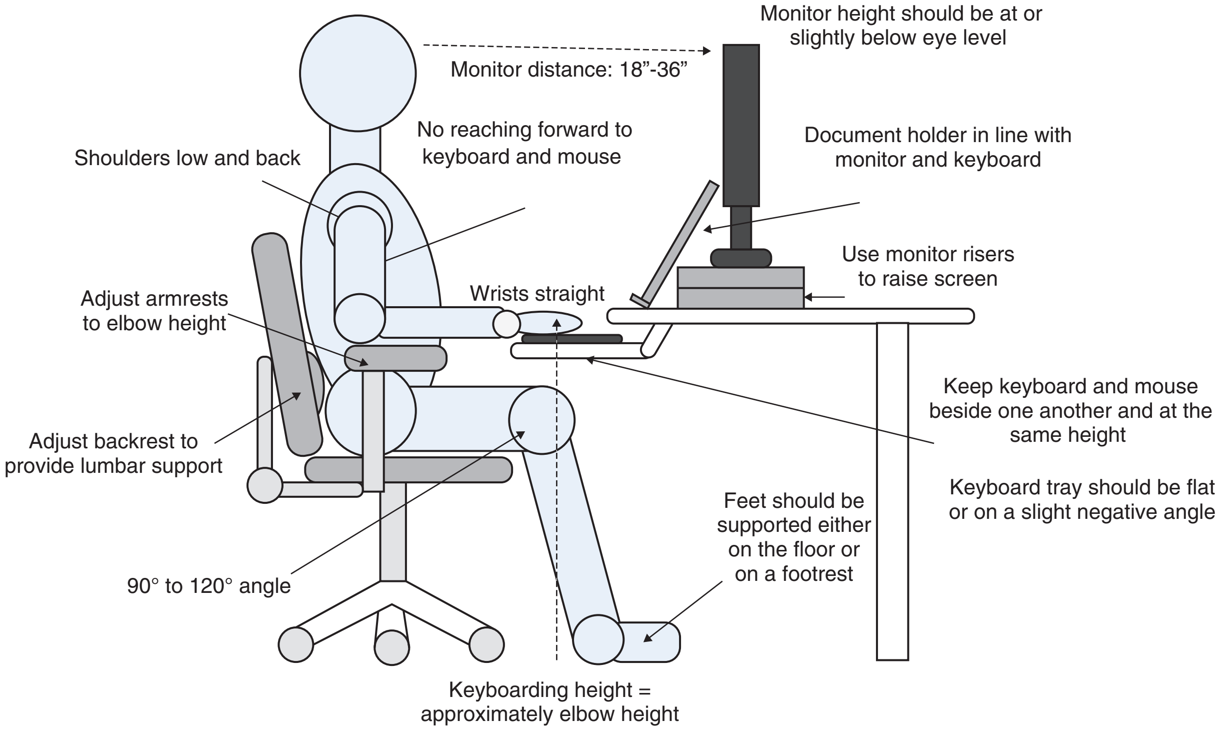
The left ventricle is the chamber that pumps the oxygenated blood out to the arteries; therefore, its performance is key to the efficiency of the entire cardiovascular system. However, due to a combination of aging of the muscle and changes in the arteries themselves, the walls of the left ventricle lose their ability to contract enough to accomplish an efficient distribution of blood through the arteries (Nikitin et al., 2006). The arteries accommodate less blood flow, which, in turn, further stresses the left ventricle (Otsuki et al., 2006). The reason the arteries accommodate less blood flow is that fats circulating throughout the blood eventually form hard deposits inside the arterial walls known as **plaque**, consisting of cholesterol, cellular waste products, calcium, and fibrin (a clotting material in the blood).

Cardiovascular efficiency is indexed by **aerobic capacity**, the maximum amount of oxygen that can be delivered through the blood, and **cardiac output**, the amount of blood that the heart pumps per minute. When viewed as an average between 20 and 70 years of age, the decline in aerobic capacity is 5 to 10 percent per decade. However, the overall decline is not a linear one. In the 30s and 40s, the decline amounts to, on average, 3 to 6 percent per decade, but by age 70, the rate rises to over 20 percent per decade. Fortunately, although the rate of decline cannot be slowed significantly, people can improve their chances of staying fit into later adulthood through high levels of physical activity earlier in life (Ades & Toth, 2005).

Middle-aged and older adults who continue to exercise at a high level of intensity do experience declines in aerobic capacity, but at a lower rate than individuals who do not exercise (Tanaka & Seals, 2003). Another health benefit shown by masters athletes is that, despite consuming more food energy than sedentary adults, they maintain lower body weight (Rosenbloom & Bahns, 2006). Indeed, masters athletes,

FIGURE 4.7

Computer Workstation Setup

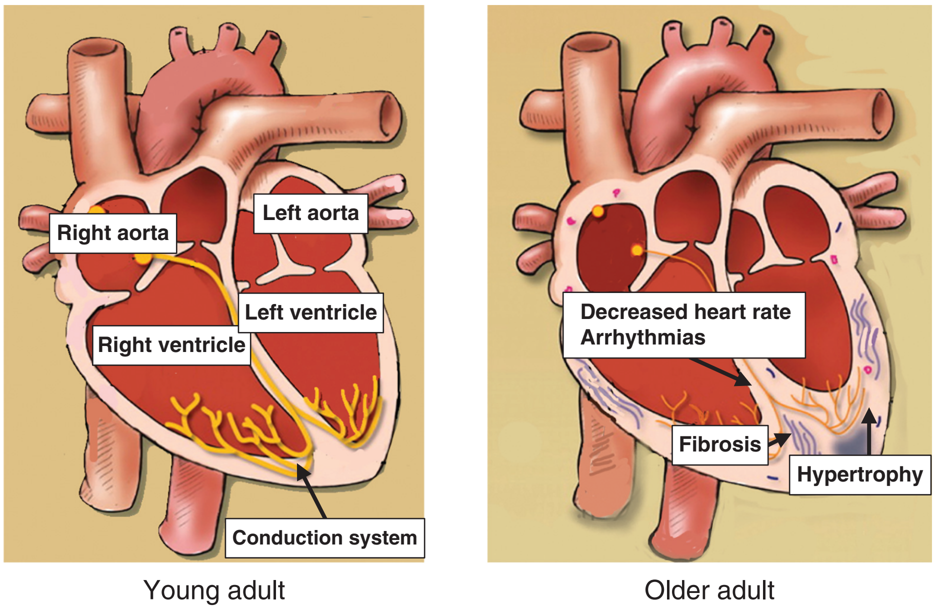

Monitor height should be at or slightly below eye level
Monitor distance: 18"-36"
Shoulders low and back
No reaching forward to keyboard and mouse
Document holder in line with monitor and keyboard
Use monitor risers to raise screen
Adjust armrests to elbow height
Wrists straight
Keep keyboard and mouse beside one another and at the same height
Adjust backrest to provide lumbar support
Keyboard tray should be flat or on a slight negative angle
Feet should be supported either on the floor or on a footrest
90° to 120° angle
Keyboarding height = approximately elbow height

Proper workstation features can help offset age-related changes in the joints to preserve mobility.

Source: From Ergonomics, Environmental Health & safety. © Eastern Washington University. Reproduced with permission from Eastern Washington University.

FIGURE 4.8

Age Changes in the Heart


Right aorta
Left aorta
Left ventricle
Right ventricle
Conduction system
Young adult
Decreased heart rate
Arrhythmias
Fibrosis
Hypertrophy
Older adult

The structure of the heart, showing major age-related changes that affect its function across adulthood.

Source: From Brian J. North, & David A. Sinclair. *The Intersection Between Aging and Cardiovascular Disease*, 13 April 2012. © American Heart Association, Inc. Reproduced with permission from American Heart Association, Inc.

or those who continue to engage in team and individual sports designed for older adults, maintain high physical functioning throughout their later years (Geard et al., 2017). However, it is important to be cautious in interpreting data showing the well-maintained physical functioning of masters athletes, given that only highly functioning middle-aged and older adults can continue to participate at such intense levels (Fien et al., 2017). Short-term training studies on middle-aged and older adults show that even previously sedentary individuals can benefit from exercise training (Falck et al., 2019). Added benefits to physical functioning include improved cognitive functioning, a topic we will return to in Chapter 6 (Chodzko-Zajko et al., 2009). To be maximally effective, exercise must stimulate the heart rate to rise to 60 to 75 percent of maximum capacity, and this training must take place three to four times a week. People benefit from many forms of aerobic activities, including walking, hiking, jogging, bicycling, swimming, and jumping rope. However, even moderate- or low-intensity exercise can have positive effects on previously sedentary older people.

The Canadian Centre for Activity and Aging at Western University in Ontario has been a leader in research and practice in the activity and aging field since 1989. As reflected in its Mission Statement, the goal is "to develop, encourage, and promote an active, healthy lifestyle for Canadian adults that will enhance the dignity of the aging process." The Centre instructs individuals from across Canada in evidence-based practices to enhance the functional fitness of older adults at every level of mobility across diverse settings such as community locations, long-term care facilities, retirement living facilities, adult day programs, and at home. The Centre provides education and leadership to health care professionals, fitness leaders, volunteers, and family members.

Lipid metabolism also plays an important role in regulating the functioning of the arteries. **High-density lipoproteins (HDLs)**, or "good" cholesterol, transport lipids out of the body. **Low-density lipoproteins (LDLs)**, or "bad" cholesterol, transport cholesterol to the arteries. Measures of an individual's cholesterol levels reflect the ratio of HDLs and LDLs. Blood levels of **triglycerides** reflect the amount of fat stored in the body's cells.

Cholesterol metabolism, then, is an important component of overall cardiovascular fitness. Moderate levels of exercise can have beneficial effects on cholesterol metabolism (Walker et al., 2009). However, the greatest benefit appears in long-term endurance athletes who have maintained active lifestyles (Campbell et al., 2019). Conversely, individuals with a lifetime history of cigarette smoking are more likely to experience poor cardiovascular health as reflected by higher levels of inflammatory markers in their blood (Yilmaz & Kayancicek, 2018).

Developments in wearable technology are making it increasingly feasible for individuals to track the intensity of their workouts as well as the number of steps they take on a daily basis. As wearable technology increases in ease of use and popularity, we might hope that adults of all ages will be more motivated to engage in healthy habits, particularly exercise. In one study on focus groups of older adults regarding the use of wearable technology, participants expressed favourable attitudes although to commit to long-term use also required internal motivation and social support (Kononova et al., 2019). If you are a fan of wearable technology, you probably know from your own experience that sharing your activity records with family members or friends can boost your motivation as well.

In summary, although there are a number of deleterious cardiovascular changes associated with aging, they are by no means uniformly negative. More importantly, there are many ways that you can both prevent and compensate for these changes. With regard to aerobic functioning, exercise is one of the best ways you can slow down the rate of your body's aging process.

Respiratory System

The function of the respiratory system is to bring oxygen into the body and move carbon dioxide out. The respiratory system accomplishes this through the mechanical process of breathing, a process that involves several structures, including the diaphragm and the muscles of the chest wall. The exchange of gases takes place within the innermost reaches of airways in the lungs, in the tiny air sacs known as **alveoli**.

Aging affects all of these components of the respiratory system. The respiratory muscles lose the ability to expand and contract the chest wall, and the lung tissue itself is less able to expand and contract during inspiration (Adachi et al., 2015). Consequently, starting at about age 40, all measures of lung functioning in adulthood tend to show age-related losses. These losses are more severe in women (Harms & Rosenkranz, 2008). Unfortunately, changes in the respiratory system can lead to breathing difficulties under duress, potentially limiting older adults' ability to maintain an exercise regimen (Roman & Rossiter, 2016).

Overall, the normal age-related changes contribute to the measure of **lung age**, which is a mathematical function showing how old your lung is based on a combination of your age and a measure obtained from a spirometer called forced expiratory volume. By calculating lung age, individuals can determine how much they are placing themselves at risk by engaging in behaviours such as smoking that are known to compromise respiratory function.

People who want to minimize the effects of aging on the lungs have two main strategies they can follow. The first may be the most obvious—to stay away from or quit smoking cigarettes. People who smoke lose more forced expiratory volume in later adulthood than those who do not (Yohannes & Tampubolon, 2014). Although it is better to quit smoking than continue smoking, there are unfortunately deleterious changes in the body's cells that remain for at least several decades after a person has quit smoking (Masayesva et al., 2006).

Exercise is the second strategy to minimize the effect of aging on the respiratory system. By strengthening the muscles of the chest wall, individuals can improve the ability of the lungs to expand and contract while breathing (Abrahin et al., 2014).

Urinary System

The function of the urinary system is to excrete wastes from the body through the urine. The urinary system is made up of the kidneys, bladder, ureters, and urethra. The kidneys are composed of **nephrons**, cells that serve as millions of tiny filters that cleanse the blood of metabolic waste (see Figure 4.9). These waste products combine in the bladder with excess water from the blood and are eliminated as urine through the urethra.

Various structures in the kidney undergo age-related changes in adulthood, leading to a lowering in the rate at which wastes are filtered through the nephrons (Bitzer & Wiggins, 2016), a change in blood flow through the kidneys, and a decrease in the ability to raise and lower the urine's concentration (Karam & Tuazon, 2013). The functional reserve of the kidney can become compromised, even in healthy older adults, leading to less effective responses to stress placed on the kidneys through illness, exertion, or extreme heat (Esposito et al., 2007). Health care professionals working with older adults must take care to factor normal age-related changes in the kidney when calculating prescription dosages, particularly for antianxiety medications, anticoagulants, and antibiotics (Guerville et al., 2019).

Changes with aging may also occur in the elastic tissue of the bladder, making it no longer capable of efficiently retaining or expelling urine. Even though the bladder does not become smaller with age, older adults also experience slight changes in the perception that they need to urinate (Pfisterer et al., 2006). Adding to intrinsic changes in the bladder that lower the rate of urinary flow in men is the fact that many men experience hypertrophy (enlargement) of the prostate, a gland located on top of the bladder. This puts pressure on the bladder and can lead men to feel frequent urges to urinate.

Approximately 30 percent of all adults 65 and older suffer from **urge incontinence**, a form of urinary incontinence in which the individual experiences a sudden need to urinate and may even leak urine. In **stress incontinence**, the individual is unable to retain urine while engaging in some form of physical exertion. According to one estimate (Anger et al., 2006), the prevalence of daily incontinence ranges from 12 percent in women aged 60 to 64 to 21 percent in women aged 85 or older. Of all women reporting incontinence, 14 percent experience it on a daily basis and 10 percent on a weekly basis. The experience of incontinence in women is linked to poorer health, decreased mobility, current use of hormone replacement therapy, being overweight, history of falls, and heart disease (Bresee et al., 2014). A condition related to urge incontinence is **overactive bladder**; in addition to incontinence, symptoms include a need to urinate more frequently than normal. The Canadian Urological Association reports that overactive bladder affects 1 in 5 men and women aged 60 and older in Canada.

It is important to remember that, despite the distressing nature of urinary incontinence and related conditions, the large majority of older adults are symptom free. Those who do have overactive bladder and incontinence, however, are likely to experience a number of associated psychological problems, including symptoms of depression, difficulty sleeping, and various forms of sexual dysfunction. These individuals are also likely to experience embarrassment, shame, and concern over having an accident. Misunderstanding the causes of the bladder dysfunction, some may blame themselves for their difficulties (Kinsey et al., 2016).

Treatment of overactive bladder and incontinence typically involves a combination of medication, exercise, and behavioural control. The first-line treatment involves behavioural controls, such as monitoring fluid intake, maintaining regular schedules for emptying the bladder, and pelvic floor ("Kegel") exercises in which the individual strengthens the urinary sphincters by contracting and relaxing them several times per day (Felicissimo et al., 2010). Behavioural treatment in which individuals learn to use these schedules and perform Kegel exercises can be administered individually or in group format (Diokno et al., 2018). Additionally, physicians may prescribe medications that reduce bladder contractions via the nervous system, preferably in conjunction with behavioural treatment (Jayarajan & Radomski, 2013).

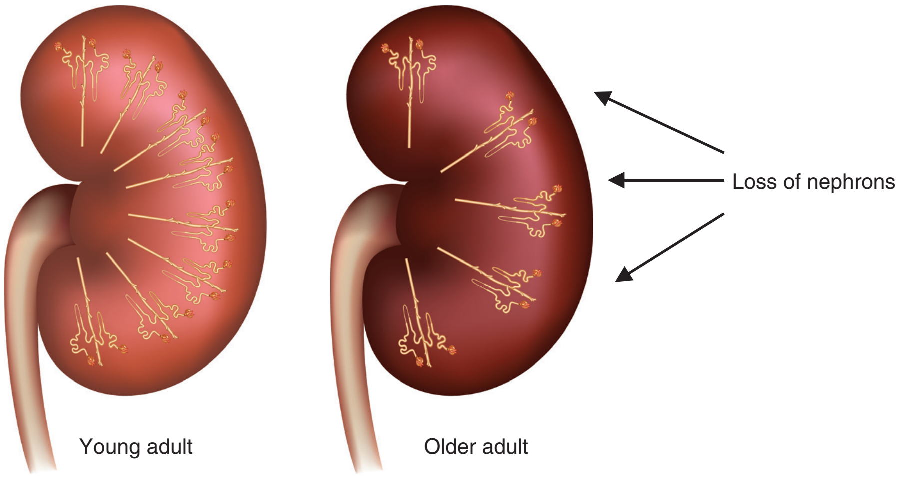


FIGURE 4.9

Aging of the Kidneys

Changes in the kidneys occur due to the effects of aging on the nephron, the basic unit of structure and function.

Yolya Ilyasova/Shutterstock.com

Kegel exercises, or pelvic muscle training, can help compensate for or even prevent urinary incontinence.

Digestive System

The digestive system is responsible for extracting nutrients out of food and eliminating as solid waste the undigested products. Digestion begins with the secretion of saliva by the salivary glands in the mouth. Aging is associated with decrease in saliva production (Eliasson et al., 2006), which can result in less efficient processing of food as it prepares for the next phases of digestion. Furthermore, loss in the ability of the lower jaw to move while chewing can lead to difficulties in eating food that is hard in texture (Wada et al., 2019). Changes in the esophagus include lowering of its effectiveness in contracting and expanding as it moves food down into the stomach (Cock & Omari, 2018). Within the stomach, fewer gastric juices are secreted, and its digestive products leave more slowly than in younger adults (O'Donovan et al., 2005). The consequence of these changes in the gastrointestinal tract can have the combined effect of leading older adults to become malnourished (Remond et al., 2015).

Fecal incontinence affects only 4 percent of the over-65 population (Alameel et al., 2010). Though relatively rare, then, it is troubling when it occurs. As is true with urinary incontinence, training in behavioural controls can help to manage the condition (Byrne et al., 2007). Increasing the amount of fibre in the diet can, however, help older adults maintain bowel regularity and prevent incontinence (Markland et al., 2009).

Physiology is not the only determinant that regulates how well a person's digestive system functions in later life. Many lifestyle factors that change in middle and later adulthood contribute to overall digestive health. For example, families typically become smaller as children move out of the home, financial resources may decrease when people retire, and age-related mobility and cognitive problems can make cooking a more difficult task for the older adult to manage. As a result, the older adult may be less motivated to eat, or to eat a healthy diet. To offset these effects, older adults can maintain their digestive health by eating a diet that includes a balance among foods containing protein, complex carbohydrates, and fats.

BODILY CONTROL SYSTEMS

Each of the organ systems we have discussed so far plays a crucial role in a person's daily physical and mental well-being; however, for these systems to work properly, their functioning must be coordinated. This is the job of the endocrine and immune systems. Together, these systems have important roles in a variety of areas related to health and quality of life.

Endocrine System

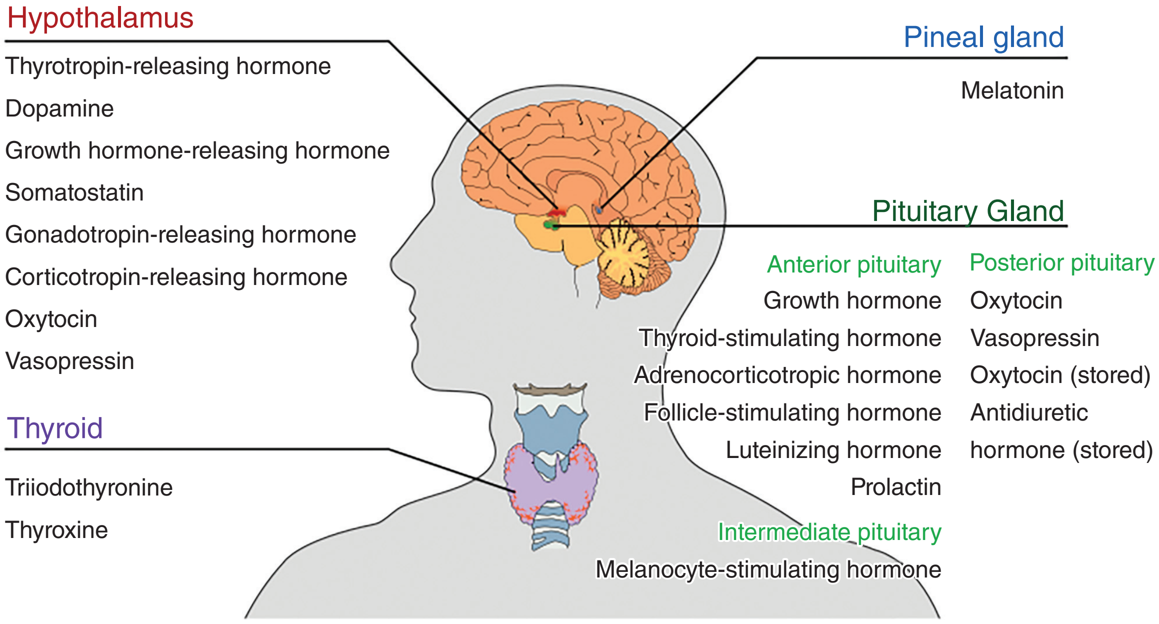
The **endocrine system** is a large and diverse set of glands that regulate the actions of the body's other organ systems (referred to as "target" organs). **Hormones** are the chemical messengers produced by the endocrine systems (see Figure 4.10). The hormones ultimately reach the target organs where they regulate their activity.

Changes with age in the endocrine system can occur at many levels. Because there are so many complex regulatory pathways, changes in one can have numerous effects on others. For example, the endocrine glands themselves may release more or less of a particular hormone. The target organs may also respond differently to stimulation from the hormones. Complicating matters is the fact that the endocrine system is highly sensitive to levels of stress and physical illness. These outside factors can further perturb whatever intrinsic changes would normally occur due to aging.

The hypothalamus and anterior (front) section of the pituitary gland, located deep within the base of the brain, are the main control centres of the endocrine system. **Hypothalamus-releasing factors (HRFs)**, hormones produced by the hypothalamus, regulate the secretion of hormones

FIGURE 4.10

Overview of the Endocrine System


Hypothalamus
Thyrotropin-releasing hormone
Dopamine
Growth hormone-releasing hormone
Somatostatin
Gonadotropin-releasing hormone
Corticotropin-releasing hormone
Oxytocin
Vasopressin
Thyroid
Triiodothyronine
Thyroxine
Pineal gland
Melatonin
Pituitary Gland
Anterior pituitary
Growth hormone
Thyroid-stimulating hormone
Adrenocorticotropic hormone
Follicle-stimulating hormone
Luteinizing hormone
Prolactin
Posterior pituitary
Oxytocin
Vasopressin
Oxytocin (stored)
Antidiuretic
hormone (stored)
Intermediate pituitary
Melanocyte-stimulating hormone

The endocrine system includes a complex set of structures that produce hormones via feedback loops involving the body's organs.

in turn produced by the anterior pituitary gland. However, HRFs are not the only source of stimulation for pituitary hormones. The pituitary hormones also respond to signals from target organs carried through the blood, indicating that more pituitary hormones are needed. The HRFs then stimulate greater hormone production by these endocrine glands. Because the hypothalamus is also a part of the nervous system, and hence is a neuroendocrine structure, it may also release HRFs in response to information sent from other parts of the nervous system.

Six hormones are produced by the anterior pituitary: growth hormone (GH, also called somatotropin), thyroid-stimulating hormone (TSH), adrenocorticotropic hormone (ACTH), follicle-stimulating hormone (FSH), luteinizing hormone (LH), and prolactin. Each of these hormones acts on specific target cells within the body and some (such as TSH) stimulate the production of other hormones. Next, we focus on the GH and TSH as they relate to the aging process.

Growth Hormone (GH). In youth, GH stimulates the growth of bones and muscles and regulates the growth of most internal organs. Throughout life, GH affects the metabolism of proteins, lipids, and carbohydrates. A related hormone produced by the liver, IGF-I (insulin-like growth factor-1), stimulates muscle cells to increase in size and number.

Together, GH and IGF-1 are called the somatotropic axis (GH and IGF-1). A decline in their activity, called **somatopause of aging**, is thought to account for a number of age-related changes in body composition across adulthood, including loss of bone mineral content, increases in fat, and decrease in muscle mass, as well as losses in strength, exercise tolerance, and quality of life in general (Lombardi et al., 2005). There are also age differences in the activity of GH. In young people, GH production shows regularly timed peaks during nighttime sleep; in older adults, this peak is smaller, a pattern that may contribute to changes (Espiritu, 2008), a topic we will discuss shortly. GH also rises during exercise, but in adults age 60 and older this response is attenuated (Weltman et al., 2006).

Given the importance of GH to so many basic processes affected by aging, GH replacement therapy (also called hGH replacement therapy) has increasingly been viewed by some as an antidote to reverse or at least slow the effects of the aging process. Although GH treatment increases lean and reduces fatty mass, there is no evidence that it has positive effects on muscle strength and performance or overall quality of life (Sattler, 2013). Ironically, despite the fact that GH replacement therapy has no proven impact on athletic performance (Hermansen et al., 2017), some professional athletes put their careers at risk to give them what they believe will be a competitive edge.

In addition to its lack of proven effects, many questions remain about the practicality of GH alone or GH in combination with testosterone as a way to counter the effects of aging. In addition to being extremely expensive (US$12,000 to $60,000 per year), there is insufficient evidence on long-term use to justify its continued administration to older adults (Samaras et al., 2014). These side effects include joint pain, enlargement of the heart, enlargement of the bones, diabetes, high blood pressure, and heart failure. Alternative treatments are currently being explored that do not carry GH's risks and expense. There is some evidence that supplements containing soy isoflavone could have the potential to remediate the symptoms of somatopause (Ajdzanovic et al., 2018).

Cortisol. We turn next to **cortisol**, the hormone produced by the adrenal gland. Cortisol serves the function of energizing the body, making it ready to react to a stressful encounter. Given that cortisol provides energy to the muscles to prepare them for action, researchers regard it as the "stress hormone."

The idea that aging causes dangerous increases in cortisol levels is known as the **glucocorticoid cascade hypothesis** (Angelucci, 2000). According to this view, increased cortisol levels accelerate neuronal loss in the hippocampus. Repeated (cascading) increases in cortisol over the lifetime lead to further degeneration. Unfortunately, the increase in cortisol negatively affects memory and other forms of cognitive functioning in older adults (Comijs et al., 2010). These findings are called into question by a fascinating study in which older and younger adults were compared in the relationship between hippocampal volume and cortisol levels under differing conditions of environmental stress. It was only when the testing conditions were made to be stressful based on the individual's age group that the relationship appeared (Sindi et al., 2014).

Thyroid Hormones. Hormones produced by the thyroid gland control the rate of metabolism also known as the **basal metabolic rate** or **(BMR)**. Beginning in midlife, the BMR begins to slow, increasing the chances of weight gain even when an individual's caloric intake remains the same. Changes in BMR are at least in part related to age-related decreases in thyroid hormones over adulthood (Meunier et al., 2005). Subclinical hypothyroidism can affect as many as 15 to 18 percent of adults over the age of 60 (Diez & Iglesias, 2004) and can progress to clinical levels in approximately half of those affected (Diez & Iglesias, 2009).

Melatonin. Sleep–wake cycles are controlled in part by **melatonin**, the hormone manufactured by the pineal gland, located deep within the brain stem. **Circadian rhythm**, the daily variations in various bodily functions, is therefore affected by this hormone (see Figure 4.11). Significant changes in circadian rhythms that occur throughout middle and later adulthood appear to correspond to the timing of peak melatonin production throughout the day (Scholtens et al., 2016).

A segment of the research community believes that melatonin supplements can reduce the effects of aging and age-associated diseases, especially in the brain and immune system. Melatonin supplements can help to offset the natural alterations in this hormone and may even have beneficial effects on other bodily systems, including cardiovascular diseases (Favero et al., 2017). However, melatonin use can produce significant side effects including confusion, drowsiness, headaches, and constriction of blood vessels, posing a danger to people with high blood pressure. Furthermore, melatonin supplements can interfere with sleep cycles if taken at the wrong time of day. If older adults nevertheless wish to take melatonin supplements, they are advised to take amounts as small as possible to mimic normal physiological circadian rhythms (Vural et al., 2014).

DHEA. The most abundant steroid in the human body, **dehydroepiandrosterone (DHEA)**, is a weak male steroid (androgen) produced by the adrenal glands. DHEA is a precursor to the male and female sex hormone, and is believed to have a variety of functions, such as increasing the production of other sex steroids and the availability of IGF-1 as well as positively influencing some central nervous system functions.

DHEA, which is higher in males than females, shows a pronounced decrease over the adult years, declining by 60 percent between the ages of 20 and 80 (Feldman et al., 2002). This phenomenon, termed **andropause**, is greater in men, although men continue to have higher levels than women throughout later life because they start at a higher baseline.

Although there are no definitive answers about DHEA's role in aging other than that the decline in DHEA is likely, DHEA replacement therapy rivals GH and melatonin in the anti-aging industry. However, like GH therapy, DHEA use presents notable health risks, mainly liver problems and an increase in risk of prostate cancer (Arnold et al., 2007). A natural substitute for some of the positive effects of DHEA replacement therapy is

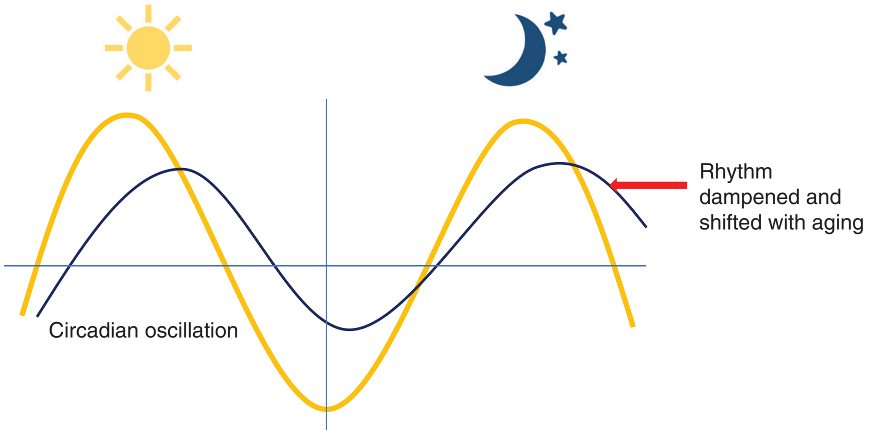


FIGURE 4.11

Shifts in Circadian Rhythms with Age

Changes in circadian rhythms occur due to alterations in the hormone melatonin, released by the pineal gland.

exercise, which can help to compensate for its loss in the later adult years, at least in men (Al-Turk & Al-Dujaili, 2016).

Female Hormonal Changes. Technically speaking, **menopause** is the point in a woman's life when menstruation stops permanently. As used in common speech, however, menopause has come to mean a phase in middle adulthood covering the years in which a woman's reproductive capacity diminishes. The more precise term for this gradual winding down of reproductive ability is **climacteric**, a term that applies to men as well. For women, the climacteric occurs over a three- to five-year span called **perimenopause**, which ends in menopause when the woman has not had her menstrual period for one year. The average age of menopause is 50 years, but the timing varies among individuals. Menopause occurs earlier in women who are thin or malnourished or who smoke.

Throughout perimenopause, there is a diminution in the production by the ovarian follicles of estrogen, the primary female sex hormone. Since the other female hormone, progesterone, is produced in response to ovulation, progesterone levels also decline during this time. The process of estrogen decline begins about 10 to 15 years before menopause, at some point in the mid-30s. By the mid-40s, the ovaries have begun to function less effectively and produce fewer hormones. Eventually, by the early to middle 50s, menstrual cycles have ended altogether. There is still some production of estrogen, however, as the ovaries continue to produce small amounts and the adrenal glands stimulate the production of estrogen in fat tissue. FSH and LH levels rise dramatically during the perimenopausal period, as the anterior pituitary sends out signals to produce more ovarian hormones. In turn, the hypothalamus produces less gonadotropin-releasing factor (GnRH).

Although women vary considerably in their progression through the menopause (as they also do during puberty), there are certain characteristic symptoms, many of which you have probably heard discussed by middle-aged and older women. One of the most prominent symptoms is the occurrence of "hot flashes," which are sudden sensations of intense heat and sweating that can last from a few moments to half an hour. These are the result of decreases in estrogen levels, which cause the endocrine system to release higher amounts of other hormones that affect the temperature control centres in the brain. Fatigue, headaches, night sweats, and insomnia are other physiological symptoms that result from fluctuating estrogen levels. Menopausal women also report that they experience psychological symptoms such as irritability, mood swings, depression, memory loss, and difficulty concentrating; however, the evidence regarding the connection between these symptoms and the physiological changes involved in menopause is far from conclusive.

Along with hormonal changes, menopause is associated with alterations in the reproductive tract. Because of lower estrogen levels, there is a reduction in the supply of blood to the vagina and surrounding nerves and glands. The tissues become thinner, drier, and less able to produce secretions to lubricate before and during intercourse. The result is the possibility of discomfort during intercourse (da Silva Lara et al., 2009). Sexual functioning can also be affected by negative societal attitudes to menopause (Heidari et al., 2019).

The impact of decreasing estrogen levels also includes effects on other bodily systems. Weaker bones, high blood pressure, and cardiovascular disease become more prevalent among postmenopausal women. Estrogen appears to provide protection against these diseases, but this is reduced at menopause. There are also deleterious changes in cholesterol levels in the blood associated with menopause, causing postmenopausal women to be at higher risk of atherosclerosis and associated conditions.

Estrogen-replacement therapy (ERT) was introduced in the 1940s to counteract the negative effects of estrogen loss on post-menopausal women. Later, estrogen was combined with the hormone progestin to reduce cancer risk. Administration of both hormones is referred to as **hormone replacement therapy (HRT)**.

Initial studies on HRT's effects on the body provided enthusiastic support, citing positive impact on skin tone and appearance, bone mineral density, immune functioning, thickness of the hair, sleep quality, prevention of accidental falls, and improvements in memory and mood. However, starting in 2002, the pros and cons of HRT were hotly debated by researchers such as whether HRT increases the risk of mortality, due to its possible relationships to breast cancer and deep vein thrombosis (blood clots). In 2015, the United Kingdom's National Health Service published a nearly 300-page report extensively documenting the risks and benefits of HRT for a variety of physical and psychological symptoms associated with menopause (National Collaborating Centre for Women's and Children's Health, 2015). As is usual, women trying to decide whether to embark on HRT should consult a health professional (Stuenkel et al., 2015). In addition to determining the timing of any such intervention, it is important to consider the form of HRT, as there are differing risks for transdermal (skin) applications compared to those associated with oral ingestion.

For women not willing to experiment with HRT given the conflicting data, alternatives are available. Locally administered vaginal creams containing estrogen can help offset dryness and pain associated with intercourse (Tyagi et al., 2019). Other recommended approaches to counteract the effect of hormonal changes include exercise, quitting smoking, lowering cholesterol in the diet, and perhaps, more enjoyably, having one alcoholic drink a day.

Male Hormonal Changes. Although men do not experience a loss of sexual function comparable to menopause (despite what you might hear about "male menopause"), men undergo **andropause**, which refers to age-related declines in the male sex hormone testosterone. The decline in testosterone is equal to 1 percent per year after the age of 40, a decrease in longitudinal studies conducted across cohorts (Liu et al., 2007). The term "late-onset hypogonadism" or "age-associated hypogonadism" has begun to replace the term "andropause," although all three terms are currently in use.

Abnormally low levels of testosterone levels are found in 6 to 10 percent of men between the ages of 40 and 70, but these rates are far higher (15 to 30 percent) in men who are diabetic or obese (Tostain & Blanc, 2008). Testosterone supplements for aging men were long considered an unnecessary and potentially dangerous proposition. However, with greater empirical support and acceptance in the medical community, testosterone supplements are in greater use, with the stipulation that treatment is accompanied by regular medical screening (Theodoraki & Bouloux, 2009). However, evidence is still lacking on the safety of long-term testosterone supplementation (Jakiel et al., 2015), including effects on bone strength (Piot et al., 2019).

Erectile dysfunction (ED), a condition in which a man is unable to achieve an erection sustainable for intercourse, is estimated to increase with age in adulthood, from a rate of 31 percent among men aged 57–65 to 44 percent of those 65 and older. Compared to younger men, however, premature climax is less common in the 65 and older population (Waite et al., 2009). However, ED is related to health problems in older men, including metabolic syndrome (Lee et al., 2012).

You are no doubt familiar with the "cure" for ED, the little blue pill known as Viagra. Phosphodiesterase type 5 inhibitors, including Viagra (the technical term is sildenafil), can be effective in treating ED, as demonstrated in a randomized control trial (Schneider et al., 2011). For men with testosterone deficiency, sildenafil may be combined with testosterone supplements (Corona & Maggi, 2010). However, these treatments must be conducted under careful medical supervision. Other treatments for ED include mechanical prostheses and implants that allow the man to experience an erection.

Based on the relationship between ED and metabolic syndrome as well as hypertension, diabetes, and obesity (Chitaley et al., 2009), however, a safer alternative, at least as an initial approach, would be to adopt a healthier diet (Esposito et al., 2010) and to exercise more frequently to reduce these conditions (Lamina et al., 2009).

Immune System

Regulating the body's ability to fight off stress, infection, and other threats to well-being and health is the immune system. In addition to protecting the body, the immune system is closely linked to the nervous system and, consequently, to behaviours, thoughts, and emotions (Lupien et al., 2009).

The two primary types of immune lymphocytes are "T cells" and "B cells," both of which are involved in destroying bodily invaders known as antigens. Researchers believe that there are widespread age-related declines in immune system functioning, a process known as **immune senescence**. As a result of immune senescence, these cells lose their ability to perform effectively, causing older adults to be less resistant to infections (Grubeck-Loebenstein, 2010). Thus, although children are more likely to develop influenza infection during seasonal flu season, mortality from such a disease occurs almost entirely among older adults unless the flu viruses were ones to which they were exposed as children or young adults. Conversely, other cells in the immune system show deleterious changes, including those that reflect the presence of some age-related chronic diseases (Valiathan & Asthana, 2016).

Age-related changes in the immune system may also be affected by factors such as diet, exercise, and exposure to stress. Zinc is an important nutrient related to the functioning of the immune system and decreases in zinc intake can therefore exacerbate immune senescence (Maywald & Rink, 2015). Similarly, deficient protein intake can lower immune functioning in older adults (Aoi, 2009). Obesity in later life can negatively alter immune functioning to accelerate deleterious changes (Garg et al., 2014), but lifetime patterns of high-intensity exercise can offset age-related declines in immune system functioning in later adulthood (Turner & Brum, 2017). Chronic stress has deleterious effects on the immune system and can therefore accelerate its rate of aging, whether experienced later in life (Gouin et al., 2008) or during early development (Dich et al., 2015). Furthermore, older adults who are clinically depressed may be more likely to experience more pronounced rates of immune senescence (Vogelzangs et al., 2014).

Previous research examining the effects of aging on the immune system may have failed to control (statistically) for variables that can influence its functioning. Perhaps for this reason, studies produce differing results on how aging affects the immune system (Dorshkind & Swain, 2009). There may also be some protective mechanisms not completely understood at present that help maintain the immune functioning of certain healthy agers. A study of the so-called "semisupercentenarians" (ages 105 to 109) suggests that resistance to immunosenescence could be an important contributor to longevity (Sizzano et al., 2018).

The many conflicting studies on aging and the immune system support the principle of interindividual variability in the aging process. This variability may reflect as much the different samples who were studied as the fact that health, diet, and exercise, not to mention biological differences, all play a role in affecting the rates at which any one individual experiences immune system change.

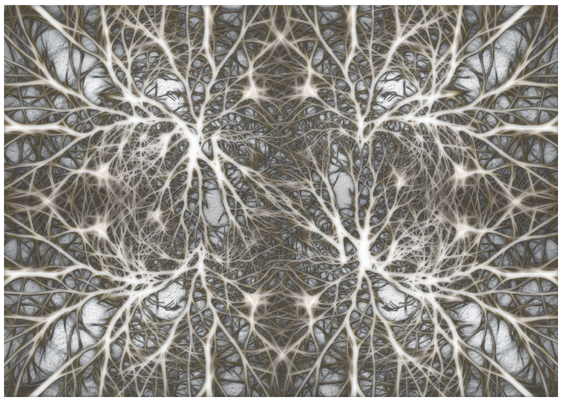
NERVOUS SYSTEM

It is no exaggeration to say that the nervous system controls all behaviour. The central nervous system makes it possible to monitor and then prepare responses to events in the environment, conceive and enact thoughts, and maintain connections with other bodily systems. The autonomic nervous system controls involuntary behaviours, the body's response to stress, and the actions of other organ systems that sustain life.

Central Nervous System

Early research on nervous system functioning in adulthood was based on the **neuronal fallout model**, the hypothesis that individuals progressively lose brain tissue over the life span because neurons do not have the ability to replace themselves when they die.

The data to support the neuronal fallout model came primarily from autopsy studies in which neuroanatomists counted the number of neurons in the brains of people of different ages. These studies tended not to take into account the cause of death, the fact that brain tissue may be destroyed after death by the methods used to study it, and the possible diseases that the subjects suffered from while alive. All of these factors may have biased the results and caused an exaggerated picture of the extent to which nerve cell populations change in later life.


Gerd Altmann/Pixabay

Neurons in the brain communicate with each other through complex networks of synapses.

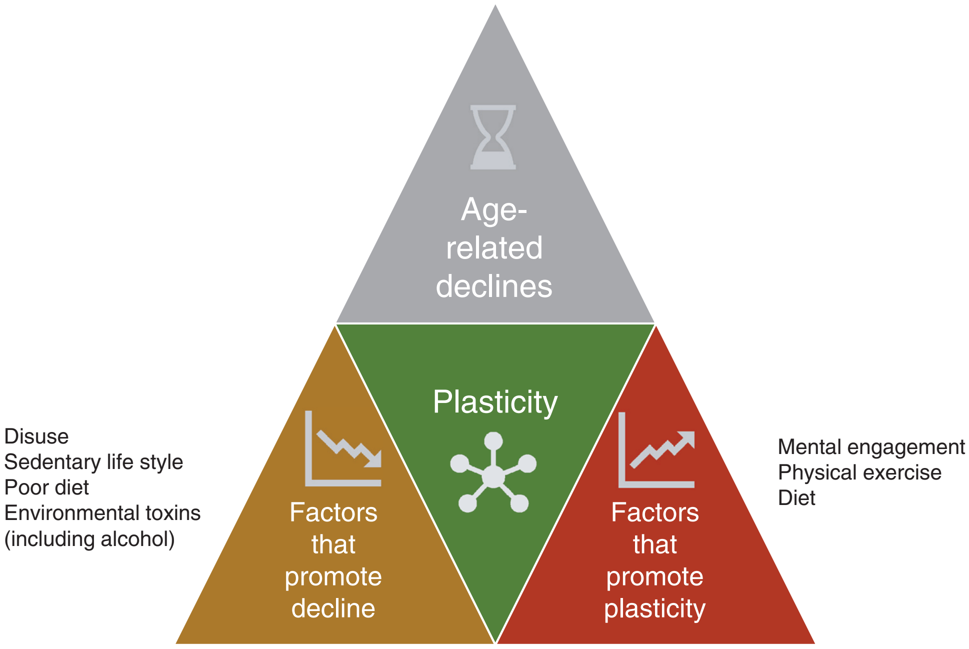
Newer findings are presenting a more optimistic view of the effect of aging on the nervous system. It now seems clear that in the absence of disease, the aging brain maintains much of its structure and function. Moreover, it is possible that neurons may actually gain in both structure and function even until late in life (see Figure 4.12). The **plasticity model** proposes that the neurons that remain alive are able to take over the function of those that die (Goh & Park, 2009). The myelination of neurons, an indication of the speed with which neurons can communicate with each other, shows decreases in some brain regions, but not in others from childhood through late life (Grydeland et al., 2019). Diet and physical exercise are important ways to maintain brain function (Murphy et al., 2014) and, consequently, cognitive functioning. Aerobic exercise in particular appears to be most beneficial in preserving and maximizing the functioning of the brain (Matta Mello Portugal et al., 2013), particularly in areas involved in attentional control and verbal memory (Bherer, 2015) (Figure 4.12).

Researchers also propose that older adults can show neural plasticity by compensating for declines in certain brain regions by activating other areas that remain intact. According to the **Hemispheric Asymmetry Reduction in OLDer adults (HAROLD) model**, the brains of older adults become activated in the opposite hemisphere when the original area suffers deficits (Manenti et al., 2011). Similarly, the **Posterior–Anterior Shift with Aging (PASA) model** proposes that the front (anterior) of the brain in older adults becomes more responsive to make up for the lower responsiveness found in the rear (posterior) of the brain (Ansado et al., 2012).

The **Compensation-Related Utilization of Neural Circuits Hypothesis (CRUNCH) model** (Schneider-Garces et al., 2010) incorporates both of these models, proposing that the demands of cognitively challenging tasks cause an overall excitation of brain activity in older adults, leading to overall patterns

FIGURE 4.12

Plasticity in the Aging Brain



Factors that promote decline can be offset by those that can promote plasticity across the adult years.

of compensation not limited to one particular area (Berlingeri et al., 2013).

Related to the idea of plasticity is that of brain reserve, or untapped resources primarily in the cerebral cortex (Cabeza et al., 2018). Educational, occupational, and health-promoting activities can help recruit the brain's own capacity to draw upon its additional resources to combat aging's impact (Whalley et al., 2016).

The findings to support these models are made possible by the increasing availability of brain-scanning methods now being used in many laboratories that in the past were either not yet developed or, even after they were, only accessible in hospitals or major research centres. There are several types of scanning methods that can produce pictures of brain structures or activity, depending on the goal of the research.

The **electroencephalogram (EEG)** is a brain-scanning method that measures electrical activity in the brain. EEG activity reflects the individual's state of consciousness and the state of the brain's arousal while the individual is asleep. The EEG pattern also shows particular patterns of brain waves when an individual engages in particular mental tasks. Clinicians use EEGs to evaluate clients for conditions such as epilepsy, sleep disorders, and brain tumours.

Computed axial tomography (CAT or CT scan) is an imaging method that clinicians and researchers use to provide an image of a cross-sectional slice of the brain from any angle or level. CT scans provide an image of the fluid-filled areas of the brain, the ventricles. The method is useful when clinicians are looking for structural damage to the brain.

Magnetic resonance imaging (MRI) is a brain imaging method that uses radio waves to construct a picture of the living brain based on the water content of various tissues. The person is placed inside a device that contains a powerful electromagnet. This causes the nuclei in hydrogen atoms to transmit electromagnetic energy (hence the term "magnetic resonance"), and activity from thousands of angles is sent to a computer, which produces a high-resolution picture of the scanned area. The picture from the MRI differentiates areas of white matter (nerve fibres) from grey matter (nerve cells) and is useful for diagnosing diseases that affect the nerve fibres that make up the white matter.

Neither the CT scan nor the MRI can show changes in the brain when the individual is involved in a task, because both provide static images. In contrast, **functional magnetic resonance imaging (fMRI)** is a type of scan that can be used to show changes in the brain over the course of a mental activity. Researchers are increasingly using fMRIs to understand the brain areas involved in the processing of information, giving an "inside look" at age differences in cognition.

Diffuse tensor imaging is a brain-scanning method that reveals the structure and integrity of white matter. It therefore is used to show the quality of connections among brain regions. Two other scans show brain activity but require injections of radioactively labelled compounds into the blood. **Positron emission tomography (PET) scan** and **single photon emission computed tomography (SPECT)** detect these radioactive compounds as they pass through the brain. The images they provide show blood flow, oxygen or glucose metabolism, and concentrations of brain chemicals. Vibrant colours at the red end of the spectrum represent higher levels of activity, and colours at the blue-green-violet end of the spectrum represent lower levels of brain activity.

Using these scanning techniques, researchers have accumulated a rapidly growing body of evidence about how aging affects the normal brain. Normal aging seems to have major effects on the prefrontal cortex, the area of the brain most involved in planning and the encoding of information into long-term memory, as well as in the temporal cortex, involved in auditory processing (Fjell et al., 2009). The **hippocampus**, the structure in the brain responsible for consolidating memories, becomes smaller across adulthood (Fraser et al., 2015).

Aging is also associated with changes in the frontal lobe in the form of abnormalities known as **white matter hyperintensities (WMH)**. These abnormalities, which appear at first as abnormalities on diffuse tensor images (Pelletier et al., 2015), are thought to be made up of parts of deteriorating neurons. Their presence appears to be related to the extent of brain atrophy and some measures of cognitive functioning (Habes et al., 2016), but their exact roles in normal aging and disease are as yet unclear.

Sleep

The literature on sleep in adulthood clearly refutes a common myth about aging, namely, that as people grow older, they need less sleep. Regardless of age, everyone requires seven to nine hours of sleep a night (Ancoli-Israel & Cooke, 2009). There is evidence that, for women, longer sleep durations are correlated with increased risk of stroke (Wassertheil-Smoller et al., 2014). Middle-aged and older adults who experience changes in sleep-related behaviour and sleep problems can suffer adverse effects on their mental and physical well-being (Hausler et al., 2019). Unfortunately, sleep problems seem to affect up to half of all older adults (Neikrug & Ancoli-Israel, 2009). Changes in circadian rhythms seem to be important in creating these changed sleep patterns, as shown in Figure 4.11.

Sleep problems in middle and later life relate in part to lifestyle as well as physiology. You almost certainly know from your own experience that your sleep is more disrupted when you are experiencing periods of stress. For instance, middle-aged adults who live with high degrees of job-related stress suffer from sleep disturbances. Other lifestyle factors also play an important role, including obesity, physical inactivity, and alcohol use (Janson et al., 2001).

Whatever the cause, we know that older adults spend more time in bed relative to time spent asleep. They take longer to fall asleep, awaken more often during the night, lie in bed longer before rising, and have sleep that is shallower, more fragmented, and less efficient (Fetveit, 2009). Their sleep patterns on an EEG show some corresponding age alterations, including a rise in Stage 1 sleep and a large decrease in both Stage 4 and REM (rapid eye movement) sleep (Kamel & Gammack, 2006). These changes occur even in people who are in excellent health.

At some point during middle to late adulthood, people also shift from a preference to working in the later hours of the day and night to a preference for the morning. Adults over 65 tend to classify themselves as "morning" people and the large majority of younger adults classify themselves as "evening" people (Hasher et al., 2005). The biological basis for this shift in preferences presumably occurs gradually throughout adulthood, along with changes in hormonal contributors to sleep and arousal patterns. The circadian rhythms of older adults are shifted so that they are slightly earlier than those of young adults relative to clock time. In general, old adults have higher rates of sleep–wake disorders than do younger adults and they are less able to adjust their sleep patterns to such conditions as jet lag and shift work (Duffy et al., 2015).

One intriguing implication of the changes in circadian rhythms with age is the possible confound that time of day presents in studies of aging and cognitive functioning. Older adults tested at their nonoptimal hours (such as late afternoon) are more disproportionately affected than are young adults (Rowe et al., 2009). This can result in a systematic bias that exaggerates the extent of age differences in performance. However, the effect of time of day on memory performance is less pronounced among older adults who engage in regular patterns of physical activity than their sedentary peers (Bugg et al., 2006).

There are concrete steps older adults can take to offset age-related changes in sleep patterns. The first is to make changes in sleep-related behaviours and adopt healthy sleep habits (Schroeck et al., 2016). Exercising (early in the day) can help both to promote healthy sleep and offset other effects of a sedentary lifestyle on physical functioning. Another behaviour that can interfere with sleep is napping during the day. Older adults who have difficulty sleeping at night therefore need to cut down on daytime naps until they can re-establish regular nighttime schedules.

Older individuals should also avoid reading late at night on their mobile devices or e-readers as bright light can interfere with circadian rhythms (Chinoy et al., 2018). Because psychological disorders can interfere with sleep in middle-aged and older adults, psychological interventions that promote mental health can have additional benefits on sleep (Kim et al., 2009).

A number of changes in other systems can interfere with the sleep of older adults. These include normal age-related changes in the bladder that lead to a more frequent urge to urinate during the night. As a result of these changes, the individual is likely to experience sleep disruptions. It is also possible that age-related changes in circadian rhythms create a vicious cycle in that urine production may itself undergo alterations in timing throughout the night (Duffy et al., 2016). Menopausal symptoms can also lead to frequent awakenings during the night (Chedraui et al., 2010). Periodic leg movements during sleep (also called nocturnal myoclonus) are another source of nighttime awakenings (Ferri et al., 2009).

The sleep of older adults can also be interfered with by **sleep apnea**, a disorder in which the individual becomes temporarily unable to breathe while asleep. People who suffer from this condition typically let out a loud snore followed by silence due to the closing of the airway. The respiratory control centres in the brain respond to the lack of oxygen, and the sleeper awakens. The periods of snoring and choking may occur as many as 100 times a night. To make up for the lack of oxygen that occurs during each episode, the person's heart is forced to pump harder to circulate more blood. As a result, the person experiences large spikes in blood pressure during the night and elevated blood pressure during the day. Over time, the person's risk of heart attack and stroke is increased.

Sleep apnea is more common in older adults with chronic diseases such as chronic respiratory diseases, heart disease, and diabetes (Okuro & Morimoto, 2014). The condition can be treated with a continuous positive airway pressure (CPAP) device, which keeps airways open during sleep; however, users often complain that the burdensome equipment inhibits sleep patterns.

Although changes in sleep occur as a normal feature of the aging process, severe sleep disturbances do not. Exercise can be helpful in resetting disturbed circadian rhythms (Benloucif et al., 2004). Sleep specialists can offer innovative approaches such as light therapy, which "resets" an out-of-phase circadian rhythm, and encouragement of improvements in sleep habits (Klerman et al., 2001). Additionally, with the greater availability and accuracy of fitness monitors, adults of all ages can benefit from tracking and improving their sleep patterns.

Temperature Control

Every summer or winter, when regions of the country suffer extreme weather, older adults are among those reported to be at greatest risk of dying from hyper- or hypothermia, conditions known together as **dysthermia**. Aging alone, however, does not seem to be the main cause of deaths due to hyperthermia, as the majority of those who die in conditions of extreme heat have heart disease (Luber & Sanchez, 2006).

There are also increasing numbers of deaths due to hypothermia in older adults (Fallico et al., 2005). The cause of the higher death rates under conditions of hypothermia may be an impaired ability of older adults to maintain their core body temperature during extremely cold outside temperatures (Thompson-Torgerson et al., 2008).

In less extreme conditions, older adults are less able to adjust their internal bodily temperature. This is because their sweat output is reduced, causing their core temperature to rise (Dufour & Candas, 2007). Adding to this is the fact that the dermal layer of the skin becomes thinner, making it more difficult to cool the skin (Petrofsky et al., 2009).

Sensation and Perception

A variety of changes occur in adulthood throughout the parts of the nervous system that affect sensation and perception.

Vision

You may associate growing older with the need to wear reading glasses and, in fact, this is what occurs. Most people require some form of corrective lenses by the time they reach their 50s or 60s.

Presbyopia is the loss of ability to focus vision on objects that are close to the viewer and therefore is the primary culprit for the need for reading glasses. Presbyopia is caused by changes in the proteins within the lens, leading to the thickening and hardening of the lens, which is the focusing mechanism of the eye (Lampi et al., 2014). By the age of 50, presbyopia affects the entire population.

There is no treatment for presbyopia, as the cause is unknown. Bifocals have been the only correction available since the time of Benjamin Franklin (who invented them). Although several alternatives to bifocals are available, none at present provide an ideal solution.

Though you cannot cure presbyopia, you may be able to alter its onset, because lifestyle habits seem to affect the rate at which the presbyopic aging process occurs. For example, smoking accelerates the aging of the lens (Kessel et al., 2006). Additionally, blue-blocking lenses can help promote eye health, including offsetting changes due to presbyopia (Downes, 2016).

Older adults are also likely to experience the loss of visual acuity, or the ability to see details at a distance. The level of acuity in an 85-year-old individual is approximately 80 percent less than that of a person in his or her 40s. Turning up the lights is one effective strategy to compensate for loss of acuity, but at the same time, older adults are more sensitive to glare. For example, older drivers are more vulnerable to the glare caused by the lights of oncoming traffic on a dark road at night or the light of the setting sun shining directly on the windshield. As a result, making lights brighter may actually impair rather than improve an older person's visual acuity.

In addition to experiencing normal age-related changes in vision, older people become increasingly vulnerable to visual disorders. In fact, about half of adults over the age of 65 report that they have experienced some form of visual impairment. The most common impairment is a **cataract**, a clouding or opacity in the lens. This results in blurred or distorted vision because the retina cannot clearly focus the images. The term "cataract" reflects a previous view of this condition as a "waterfall" behind the eye that obscured vision.

Cataracts affect about 17 percent of the over-40 population (Congdon et al., 2004). Cataracts start as a gradual cloudiness that progressively grows more opaque and bothersome. Although they are most often white, they may also appear to be yellow or brownish in colour. If the cataracts have a yellow or brown tone, colours will take on a yellow tinge similar to the effect of wearing coloured sunglasses. Cataracts appear to develop as a normal part of the aging process, but other than the changes that occur in the lens fibres, their cause is not known. A variety of health conditions can affect the development of cataracts, including obesity, high blood pressure, high glucose levels, and excess blood lipids (Poh et al., 2016). On the protective side, blue-blocking lenses can further help protect against cataracts as can beta-carotene and vitamin C (Sideri et al., 2019).

Spencer Sutton/Science Source

How the world may appear to an individual with cataracts.

As a cataract develops, the person's vision becomes increasingly impaired, both under conditions of low light, as acuity is reduced, and under conditions of bright light, as a result of increased susceptibility to glare. Bright lights may seem to have a halo around them. These are significant limitations and can alter many aspects of the person's everyday life. It is more difficult to read, walk, watch television, recognize faces, and perform work, hobbies, and leisure activities. Consequently, people with cataracts may become more dependent on others, because they cannot drive or go out at night on their own.

Fortunately, cataracts can be successfully treated with little inconvenience or pain. Enormous strides have been made in the treatment of cataracts through advances in surgical procedures. Currently, people who undergo cataract surgery are through in an hour or less, under local anesthesia and with no hospital stay. They recover their vision within one to seven days, and many people's vision is so improved that they rely only minimally on corrective lenses.

A second significant form of blindness that becomes more prevalent in later adulthood is **age-related macular degeneration (ARMD)**, a condition caused by damage to the photoreceptors located in the central region of the retina known as the macula. This area of the retina is normally used in reading, driving, and other visually demanding activities so that the selective damage to the receptors in the macula that occurs is particularly incapacitating because central vision is impaired. ARMD is prevalent among increasingly older age groups of adults, affecting about 8 percent of adults aged 40 to 85 years; it is the fourth most common form of blindness worldwide (Jonas et al., 2017).

There are two forms of ARMD. In the "dry" form, individuals develop drusen in the macula, which are yellow deposits under the retina. In the "wet" form, blood vessels in the retina leak blood or fluid. The wet form is most likely to progress rapidly, causing a sudden loss of central vision. The majority of people with ARMD have the dry form.

Although there is no known treatment for ARMD, the measures individuals can take to prevent its development are similar to those to maintain good eye health in general, particularly including beta-carotene in the diet and wearing glasses that protect from blue and UV light.

Glaucoma is the term used for a group of conditions causing blindness due to destruction of the neurons leading from the retina to the optic nerve by increased pressure within the eyeball. The most common type of glaucoma develops gradually and painlessly, without symptoms. Therefore, it may not be detected until the disease reaches advanced stages. Glaucoma causes a loss of peripheral vision and, over time, may cause the remaining vision to diminish altogether. More rarely, the symptoms appear suddenly: they include blurred vision, loss of side vision, perception of coloured rings around lights, and experience of pain or redness in the eyes. The causes of some forms of glaucoma can be controlled but not cured, and others can be treated successfully through surgery.

Glaucoma is the third leading cause of blindness, and it affects more than 70 million people around the world, about 10 percent of whom are blind in both eyes (Quigley et al., 2006). This is expected to rise to 112 million people by 2040. Glaucoma is more common in men (Flaxman et al., 2017), and its prevalence is highest in Blacks and people living in urban areas (Tham et al., 2014). In addition to variations by race and sex, glaucoma is higher in people who are nearsighted, have diabetes, or have a family history of glaucoma. Arthritis (Perruccio et al., 2007) and obesity (Imai et al., 2010) are additional risk factors.

Visual disturbances in older adults, whatever their cause, require the attention of health care professionals. They might be treatable, but even if they're not, their presence can relate to psychological symptoms including depression and isolation. Moreover, visual problems can create difficulties in other areas of functioning, such as increasing the likelihood of a person's falling or making medication errors that can have serious consequences in their own right (Pelletier et al., 2009).

Hearing

Age-related hearing loss occurs progressively through later adulthood. The most common form of age-related hearing loss is **presbycusis**, in which degenerative changes occur in the cochlea or auditory nerve leading from the cochlea to the brain. Presbycusis is most often associated with loss of hearing of high-pitched sounds, because the receptor cells that are triggered by high-frequency stimuli are located toward the front of the cochlea (the sensory structure responsible for hearing), the area that receives the most stimulation by noise waves in general.

Hearing loss clearly has an effect on the older adult's ability to engage in conversation (Murphy et al., 2006). In turn, older adults may be more likely to avoid potentially noisy situations, such as eating at a restaurant.

Presbycusis can result from metabolic changes that affect the tissue in the wall of the cochlea, leading to less amplification of sound. Sensory presbycusis is the result of chronic noise exposure. Increasing age in middle to later adulthood is associated with increases in the metabolic form of presbycusis (Vaden et al., 2017).

The single best way to minimize the risk of developing significant hearing loss due to presbycusis is to reduce your exposure to noise. The next time you turn up the music playing in your headphones or go to a loud concert, think about the long-term effects on your hearing, particularly if you wake up the following morning with your ears still ringing.

Another hearing disturbance that is relatively common in older people is **tinnitus**, a symptom in which the individual perceives sounds in the head or ear (such as a ringing noise) when there is no external source. The condition can be temporarily associated with use of aspirin, antibiotics, and anti-inflammatory agents. Changes in the bones of the skull due to trauma and the buildup of wax in the ears may also contribute to tinnitus. Although treatments are available for

Alex Blăjan/Unsplash.com

Listening to loud music through headphones can place individuals at risk for noise-induced presbycusis.

tinnitus (generally dependent on the cause of the symptom), there is no cure.

Using hearing aids can help adults with hearing loss overcome many hearing-related problems. With increasing improvements in the quality of hearing aids, as well as reductions in their size, people no longer need to rely on devices that are visible to others. These miniature devices considerably reduce the social stigma many associate with the need to wear a hearing aid. They are also more effective, particularly because people are more likely to use them given that they are so small and easily hidden.

Even without a hearing aid, however, it's possible for older adults to improve their ability to understand speech if they take advantage of various communication strategies. The first is to look directly at the person speaking to them and to make sure that there is enough light that they can clearly see the person's face. Older adults should also turn down background noise that could interfere with the audio stream they are trying to follow, whether it's a person, a television, or the radio. At restaurants and social gatherings, they should find a place to talk that is as far as possible from crowded or noisy areas. They can also ask the people speaking to them not to chew food or gum while talking, and not to speak too quickly (Janse, 2009).

Many people talking to an older adult (with or without hearing loss) tend to overcompensate and raise their voices unnecessarily high. This has the unfortunate effect of interfering with the speech signal. It is also important for the speaker to enunciate carefully, speak in a low tone (to offset presbycusis) and look straight at the older adult. Most importantly, if you're the speaker, you should avoid talking to the person as if he or she were a child. This also includes referring to the individual in the third person or leaving the person out of the conversation altogether (based on the assumption that he or she can't hear).

Providing context is also useful, because this provides additional cues for the listener about your topic of conversation. You can also gauge whether you are being understood by paying careful attention to how the other person is responding to you, both verbally and non-verbally. Finally, rather than becoming frustrated or upset with the listener, maintaining a positive and patient attitude will encourage the listener to remain more engaged in the conversation.

Balance

As important as the maintenance of visual and auditory functioning are with increasing age, the sense of balance can mean the difference between life and death. Loss of balance is one of the main factors responsible for falls in older adults (Dickin et al., 2006). In Canada, falls are the leading cause of injury among older adults, and between 20 and 30 percent of older adults fall each year (Public Health Agency of Canada, 2014). The majority of falls result in broken or fractured bones (one-third of these are hip fractures). Falls are also a common cause of traumatic brain injury. Older adults who have experienced a fall remain in hospital, on average, nine days longer than those admitted for other reasons. There has been a steady increase in the number of deaths due to falls. Because of the potentially devastating effects of falls on older people, fall prevention programs have become very popular and widely used in Canada. For example, the Canadian Fall Prevention Education Collaborative provides an evidence-based curriculum for those who work with older adults to prevent falls.

In addition to experiencing changes in balance, people who are more likely to fall have a history of previous falls, are weaker, have an impaired gait, and are more likely to be on medications (Tinetti & Kumar, 2010). Older individuals who have more difficulty detecting body position are more likely to lose their balance or fail to see a step or an obstacle in their path on a level surface.

Chuti/Shutterstock.com

Uneven pavements can increase the risk of falls in older adults.

It is natural that people who have had a painful and perhaps frightening experience with a fall become anxious in a subsequent situation where they feel insecure; they then become even more unsteady in their gait (Reelick et al., 2009). The **fear of falling** can create a vicious cycle in which older individuals increasingly restrict their movement. In this regard, fear of falling becomes an unhealthy form of identity accommodation, in which individuals lose all confidence in the ability to avoid a fall. This, in turn, increases their perceived instability, making them perhaps more physiologically unstable as well (Horslen et al., 2015).

The two symptoms most frequently associated with age-related vestibular dysfunction are dizziness and vertigo. **Dizziness** is an uncomfortable sensation of feeling light-headed and even floating. **Vertigo** refers to the sensation of spinning when the body is at rest.

Because the vestibular system is so intimately connected to other parts of the nervous system, people may experience

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Practising tai chi can help older adults maintain their balance and flexibility to offset age changes that can increase their risk of falling.

symptoms of vestibular disturbance in the form of problems such as headache, muscular aches in the neck and back, and increased sensitivity to noise and bright lights. Other signs of vestibular disturbance include fatigue, inability to concentrate, unsteadiness while walking, and difficulty with speech. Increased sensitivity to motion sickness is another common symptom. Some of these changes may come about with diseases that are not part of normal aging; others may occur as a result of normative alterations in the vestibular receptors.

Exercise can help older adults learn to compensate for factors that increase their chance of falling. The most beneficial forms of exercise include functional training to control the core bodily muscles involved in posture and balance. These are exercises that can be practised on a daily basis in the individual's own home (Olij et al., 2019). Tai chi is another form of exercise that helps to promote balance and flexibility. Together, such interventions are estimated to result in a significant reduction of fall risk as high as 34 percent (Sherrington et al., 2019).

Falls can also be prevented if a person wears proper eyeglasses, uses a prosthetic aid in walking, outfits the home with balance aids such as handrails, and develops greater sensitivity to the need to take care while walking. Having an accurate eyeglass prescription is crucial, given that vision provides important cues to navigating the environment. Accordingly, older adults with uncorrected visual problems are more vulnerable to falls (Vitale et al., 2006).

Although a person may resist using a walking stick, this is an adaptation to changes in balance that can lead to significant improvements in mobility. At home, people can also make relatively simple adaptations that prevent falling, such as getting a shower chair or bath bench in the tub and installing a handheld shower head. Learning to sit while performing ordinary grooming tasks, such as shaving, further reduces a person's risk of falling. People can also outfit their kitchens to minimize the fall risk—for example, by bringing in a tall (but stable) chair or stool that they use while they cook. Having multiple telephones in the home is another useful strategy so that the need to hurry to reach the phone (and possibly fall) is avoided. Even better, keeping a cell phone close by or using smartwatch technology reduces this risk. The person at risk of falling can also derive feelings of security, and a lower risk of falling, by having the cell phone nearby in case he or she actually does fall and needs help.

In addition to practical strategies, older individuals can learn to develop greater sensitivity to the floors that they navigate, such as when stepping onto a tile floor from a carpet. They can also be trained to recognize situations that should be avoided, such as bumpy sidewalks or wet floors. As they do, they gain a greater sense of personal control over the likelihood of falling, lowering their fear of it and increasing their ability to navigate around their environments within safe limits.

Smell and Taste

Smell and taste belong to the chemical sensing system referred to as chemosensation. The sensory receptors in these systems are triggered when molecules released by certain substances stimulate special cells in the nose, mouth, or throat. Despite the fact that the olfactory receptors constantly replace themselves, the area of the olfactory epithelium shrinks with age, and ultimately the total number of receptors becomes reduced throughout the adult years. At birth, the olfactory epithelium covers a wide area of the upper nasal cavities, but by the 20s and 30s, its area has started to shrink noticeably.

The rates of olfactory impairment are higher in older than in middle-aged adults, with 13 percent of 60- to 69-year-olds and 39 percent of those 80 and older showing some form of dysfunction. The environmentally important odours of smoke and natural gas show impairments among those 70 and older, with 20 percent misidentifying smoke and 31 percent natural gas (Hoffman et al., 2016). Perhaps for this reason, mortality rates are higher in older adults with olfactory deficits, but these individuals also are in poorer health (Liu et al., 2019).

There are also other potential contributors to poorer olfaction in older adults, including a history of smoking, sinus problems, certain medications, and chronic disease (Rawson, 2006). Tobacco smoke is a major source of interference with taste and smell. Although people who quit smoking eventually experience an improvement in their sense of smell, this can take many years (equal to the number of years spent smoking). Dentures are another cause of loss of taste sensitivity because they may block the receptor cells of the taste buds. Add to this the fact that certain medications also interfere with the sense of taste (Schiffman, 2009), it is difficult to determine whether aging brings with it inherent changes in taste or not.

Cognitive changes are also believed to be associated with loss of smell sensitivity. Older adults who have experienced the greatest impairment in cognitive functioning may be the most vulnerable to loss of odour identification abilities. In one longitudinal study, researchers followed older adults over a three-year period and observed that people with the most rapid decline in cognitive processes had the greatest rate of decline in the ability to label various odours (Wilson et al., 2006).

Taste disorders in older adults appear to affect all five forms of taste (salty, sweet, bitter, sour, and umami), with the most pronounced increase in detection ability involving sour and bitter tastes. There are dietary implications of these changes, with reports that older adults have higher consumption rates of sweet and salty foods (Sergi et al., 2017). Rather than being due to intrinsic processes involved in aging, however, it appears that taste disorders have other causes including drug use, zinc deficiency, and both oral and chronic diseases (Imoscopi et al., 2012).

Although nothing can be done to reverse age-related losses of smell and taste once they occur, people who suffer from severe losses may benefit from medical evaluations and treatments for underlying conditions. Apart from such interventions, older people can also take advantage of strategies to enhance the enjoyment of food, such as expanding their food choices, planning meals in pleasant environments, and finding good dining companions.

Somatosensory System

You are able to move around in the environment through the operation of the somatosensory system, which sends information about touch, temperature, and position to your nervous system. Awareness of bodily position is made possible by proprioception, which provides information about where the limbs are placed when you are standing still. Kinesthesis applies to the knowledge that receptors in the limbs provide when the body is moving. Through proprioception, you would know that you are poised at the top of a staircase, ready to take your first step downward; through kinesthesis you would know that you are actually moving down those stairs.

Touch. A well-established body of evidence links loss of the ability to discriminate touch with the aging process throughout adulthood as a result of changes in the receptors underneath the skin (Garcia-Piqueras et al., 2019). In the hands, loss of touch sensitivity seems to be greater for men than for women across adulthood. Changes in touch sensitivity in the feet can contribute to difficulties with balance contributing to other changes in the vestibular system to increase older adults' risk of falling (Hafstrom et al., 2018).

Pain. The question of whether older adults are more or less sensitive to pain is a topic of considerable concern for health practitioners. Changes in pain perception with age could make life either much harder or much easier for individuals with illnesses (such as arthritis) that cause chronic pain.

There is no evidence that older adults somehow become immune to or at least protected from pain by virtue of age changes in this sensory system. Lower back pain for at least 30 days in the past year was reported among 12 percent of a large-scale sample of Danish elders (Leboeuf-Yde et al., 2009). Chronic back pain is exacerbated by osteoarthritis in the hip; together restrictions in hip mobility and back pain can increase older adults' quality of life, particularly in the areas of social functioning, mental health, and limitations in the ability to carry out everyday activities (Hicks et al., 2018). Limitations in the range of motion in the knee create further difficulties for some older adults (Jung et al., 2018).

The experience of pain can also interfere with cognitive performance, in addition to being a limitation in an individual's everyday life. In one sample of more than 300 older adults, poorer performance on tests of memory and spatial abilities was observed among individuals who suffered from chronic lower back pain (Weiner et al., 2006). In a study of more than 11,000 elders in the United Kingdom, researchers found that regardless of the presence of other complicating conditions, such as depression and anxiety, the experience of chronic pain had a direct relationship to the experience of cognitive symptoms (Westoby et al., 2009). You should keep this finding in mind when evaluating studies of cognitive performance in older adults, because it is possible that many reports of age differences reflect the fact that older adults are distracted by pain.

In addition, pain can be particularly difficult to detect in older persons with major cognitive impairment, as their ability to self-report their pain levels is impaired. In their program of research on pain in older adults, Thomas Hadjistavropoulos and his colleagues at the University of Regina are developing evidence-based clinical protocols to assess pain in those with severe dementia (Hadjistavropoulos et al., 2018).

Psychological factors may also interact with the experience of pain in older adults. Symptoms of benign pain may diminish along the aging process because older adults have become habituated to the daily aches and pains associated with changes in their bones, joints, and muscles. It is also possible that cohort factors interact with intrinsic age changes to alter the likelihood that complaints about pain will be expressed. The experience of pain is associated with the personality trait of stoicism (the tendency to suffer in silence) (Yong, 2006). Older adults may simply not wish to admit to others, or even themselves, that they are feeling some of those aches and pains.

People can reduce the risk of pain in later adulthood by controlling for the factors related to greater pain prevalence. Obesity is highly associated with chronic pain, even after controlling for education and related conditions such as diabetes, hypertension, arthritis, and depression (Ray et al., 2011). Thus, controlling for weight would seem to be an important and effective intervention. At the same time, rather than relying on pain medications, all of which carry the risk of abuse or at least interactions with treatments for other conditions, it is also advisable for older adults to learn to manage their pain through holistic methods (Bruckenthal et al., 2016).

Depression, stress, and lack of sleep can contribute to the experience of pain in older adults, outweighing even the benefits that can be provided by social support (Musich et al., 2019).

In summary, changes in physical functioning have important interactions with psychological and sociocultural factors, and can influence an individual's identity in the middle and later years of adulthood. Fortunately, there are many preventive and compensating steps that people can take to slow the rate of physical aging.

SUMMARY

1. Appearance is an important part of a person's identity, and throughout adulthood, changes in the components of appearance all undergo change. Following the interactionist model of development, physical changes affect a person's behaviour, which can modify the actions the individual takes to slow or modify those changes. Many age changes in the skin are the result of photoaging. The hair thins and becomes grey, and in men in particular, baldness can develop. There are significant changes in body build, including loss of height, increase of body weight to the 50s followed by a decrease, and changes in fat distribution. However, adults of all ages can benefit from exercise, which can maintain muscle and lower body fat.
2. Mobility reflects the quality of the muscles, bones, and joints. Age-related losses in mobility typically start in the 40s. The process of sarcopenia involves loss of muscle mass, and there is a corresponding decrease in muscle strength, although muscular endurance is maintained. Strength training is the key to maintaining maximum muscle functioning in adulthood. Bones lose mineral content throughout adulthood, particularly among women, the extent of which is determined in large part by genetic factors. Diet and exercise are important areas of prevention. The joints undergo many deleterious changes, and although exercise cannot prevent these, middle-aged and older adults can benefit from strength training, which builds muscles that support the joints, and flexibility training, which maintains range of motion even in damaged joints.
3. The cardiovascular system undergoes changes caused by alterations in the heart muscle and arteries that lower aerobic capacity, cardiac output, and maximum heart rate. It is crucial for adults to avoid harmful fats in the diet and to engage in a regular pattern of aerobic exercise in order to minimize changes in the cardiovascular system. The respiratory system loses functioning as a result of stiffening of lung tissue, starting at about age 40. Important preventive actions are to avoid (or quit) cigarette smoking and maintain a low BMI. Although age changes in the kidney are likely due to nephron loss, other environmental factors, such as smoking, illness, or extreme exertion, appear to play a role. Changes in the urinary system make the kidney more vulnerable to stress and less able to metabolize toxins, including medications. In older adults, the bladder becomes less able to retain and expel urine, although the majority of people do not become incontinent. Behavioural methods and/or medication can correct normal age-related changes in urinary control. The digestive system becomes somewhat less efficient in older adults, but there is not a significant loss of functioning. In addition to the physiological changes, lifestyle factors impact overall digestive health. Improved dietary habits can also affect the digestive health of older adults.
4. The endocrine system is the site of many changes in the amount and functioning of the body's hormones as people age. The hormones affected by age include growth hormones, cortisol, thyroid hormones, melatonin, and DHEA. The climacteric is the period of gradual loss of reproductive abilities. After menopause, which typically occurs at the age of 50, women experience a reduction in estrogen. Decreases in testosterone level in older men, referred to as andropause, are not consistently observed. Erectile dysfunction is experienced by 44 percent of men age 65 and older. Changes in the immune system, referred to as immune senescence, are seen primarily in a decline in T cell and B cell functioning. Diet and exercise can counteract loss of immune responsiveness in older adults, while chronic stress can accelerate the immune system's aging.
5. Normal age-related changes in the nervous system were once thought of as neuronal fallout, but it is now recognized that there is much plasticity in the aging brain. The increasing availability of brain-scanning methods for research purposes has revealed considerable variation in age-related alterations in brain structure. There is a rise in Stage 1 and a decrease in Stage 4 and REM (dream-related) sleep. Changes in circadian rhythms cause older adults to awaken earlier and prefer the morning for working. Poor sleep habits and the coexistence of psychological or physical disorders (such as sleep apnea) can interfere further with the sleep patterns of middle-aged and older adults. In many cases, dysthermia (including hyper- or hypothermia) is related to the presence of disease.
6. Visual acuity decreases across adulthood, and presbyopia leads to a loss of the ability to focus the eye on near objects. Cataracts, age-related macular degeneration, and glaucoma are medical conditions that can lead to reduced vision or blindness. Presbycusis, the most common form of age-related hearing loss, can interfere with the ability to communicate. Hearing aids can help older adults overcome many hearing-related problems. Older adults are more vulnerable to loss of balance, particularly when they suffer from dizziness and vertigo. Balance training can compensate for these changes and help reduce the fear of falling. There is loss of the perception of the position of the feet and legs, adding to other age-related changes in balance. Smell and taste show some losses with age, but both senses are extremely vulnerable to negative effects of disease and environmental damage, in particular from tobacco smoke. Loss of the ability to discriminate touch is observed in aging, particularly in the hands and feet. Findings on changes in pain perception with aging suggest important connections to everyday functioning as well as cognitive performance.

5

Health and Prevention

Think you know what it takes to stay healthy into adulthood? Check out some of the top 10 ways. It's never too late to get a head start!

AGEFEED

#TIPS

1. **Stay connected to friends and family.** Loneliness can be harmful to your health.
2. **Eat a healthy diet.** High-fibre fruits, veggies, and whole grains help keep the digestive system functioning. Avoid sugar, salt, prepackaged foods, butter, and fatty meats.
3. **Watch your weight to avoid arthritis.** Excess weight puts pressure on the weight-bearing joints eventually leading to irreversible damage.
4. **Stay physically active.** Strength training and balance exercises can help reduce falls as you age.
5. **Practice sleep healthy habits.** Turn off technology before bed and stick to a consistent schedule.
6. **Stop smoking or using any tobacco products.** Now!
7. **Take good care of your teeth.** Brushing, flossing, and seeing the dentist can help prevent later-life oral problems including gum recession, staining, decay, and tooth loss.
8. **Learn to manage stress.** Coping with stress can promote physical and mental health.
9. **Stay on top of your health.** Get regular checkups and follow your medical professional's advice.
10. **Take dance classes.** You'll get your exercise while benefiting from the mental stimulation involved in learning new moves and remembering choreography.

Chronic illnesses can significantly interfere with the quality of a person's daily life, adding to normal age-related changes in physical functioning that affect the individual's psychological well-being and identity. Psychologists providing services to older adults with chronic illnesses may find that these chronic illnesses may make it more difficult to diagnose and treat psychological disorders. Although it is important to distinguish illness from normal aging, there are significant chronic diseases to which people become increasingly susceptible with age.

According to the 2018 Canadian Community Health Survey, among those 65 years of age and older, 45 percent had arthritis, 43 percent had high blood pressure, and 18 percent had diabetes. Interestingly, in spite of these high rates of chronic illness, the vast majority of participants (91 percent) reported that they were either satisfied or very satisfied with their lives (Statistics Canada, 2020c). Chronic conditions are also high among those in the 45 to 64 age group. Data from the Canadian Longitudinal Study on Aging found that 50 percent of participants in this study had three or more chronic conditions, with an average number of 2.41. The top five conditions were allergies (40 percent), back problems (25 percent), hypertension (26 percent), osteoarthritis (19 percent), and diabetes (13 percent). Having multiple chronic conditions is called multimorbidity and, in this study, was related to being female and having a low income (Sakib et al., 2019).

The prevalence of chronic conditions is higher among Aboriginal populations than non-Aboriginal populations. Table 5.1 shows the prevalence rates for various age groups across six chronic illnesses. With the exception of cancer in the 75+ age group, older Aboriginal adults experience higher prevalence rates across all conditions (Rosenberg et al., 2009). Moreover, when asked to rate their health status as excellent, good, fair, or poor, older Aboriginal adults are more likely than older non-Aboriginal adults to report poor or fair health status.

The Aboriginal population is demographically younger than the non-Aboriginal population; however, it is growing. Contributing to the health challenges experienced by older Aboriginal adults are food insecurity and the high cost of food in remote areas and the movement away from traditional, nutrient-dense diets to more processed foods. Other social determinants of poor health are housing shortages and overcrowding, the outward migration of younger adults resulting in fewer family caregivers, inadequate health and mental health services (including long-term care facilities), poor literacy skills in order to understand health conditions, and a lack of documentation (e.g., birth certificates) required to obtain pensions (Habjan et al., 2012; Health Council of Canada, 2013). The lack of culturally safe care is a pressing issue for many older Aboriginal adults, for example, a lack of knowledge among health care providers about historic experiences (e.g., colonization, residential school), the traumatic legacies of these experiences, and the practical realities of daily life in Aboriginal communities (Health Council of Canada, 2013).

In spite of the many challenges facing older Aboriginal people, many are highly resilient in the face of these disparities, raising grandchildren and providing a cultural link to traditional languages, values, and practices. Perhaps most importantly, older adults help to instill a sense of pride in the broader community, among young and old alike (Health Council of Canada, 2013).

TABLE 5.1

Aboriginal and Non-Aboriginal Populations Reporting Prevalence of Specific Conditions (percent)

		18–54	55–64	65–74	75+
Diabetes	Aboriginal	6	21	26	23
	Non-Aboriginal	2	9	13	13
Arthritis	Aboriginal	17	46	56	54
	Non-Aboriginal	9	30	40	47
Cancer	Aboriginal	2	6	9	5
	Non-Aboriginal	0.8	4	5	7
Stroke	Aboriginal	1	6	7	18
	Non-Aboriginal	0.3	1	3	7
Heart disease	Aboriginal	5	18	23	36
	Non-Aboriginal	2	9	18	26
Stomach problems	Aboriginal	10	17	18	15
	Non-Aboriginal	3	4	4	5

Source: Data from Rosenberg, M. W., Wilson, K., Abonyi, S., Wiebe, A., Beach, K., & Lovelace, R. (2009). *Older Aboriginal peoples in Canada: Demographics, health status, and access to care* (Social and Economic Dimensions of an Aging Population, Research Paper No. 249). Hamilton, ON: McMaster University.

KEY CONCEPTS IN HEALTH AND PREVENTION

Health is more than the absence of illness or disability. According to the World Health Organization (1948), **health** is a state of complete physical, mental, and social well-being. This multidimensional definition fits well with the biopsychosocial model, as it emphasizes all realms of the individual's functioning. In addition, as we will see throughout this chapter, people who are healthy are not just ill but are able to maintain a sense of well-being.

It is important to keep in mind, then, that health is not simply the absence of disability. However, disability can limit the individual's ability to adapt to the requirements of everyday life. Many health researchers and practitioners find it useful to assess an older adult's ability to perform **activities of daily living (ADL)**, which are the tasks of bathing, dressing, transferring, using the toilet, and eating. An expanded measure evaluates the **instrumental activities of daily living (IADL)**, which include the ability to use the telephone, go shopping, prepare meals, complete housekeeping tasks, do the laundry, use private or public transportation, take medications, and handle finances (Lawton & Brody, 1969). These measures provide a functional assessment of health status by indicating the degree of independence the individual can maintain, whether living at home or in an institution.

The behavioural risk factors for chronic disease include tobacco use, alcohol use, unhealthy diet, sedentary lifestyle, and obesity (see Figure 5.1). According to the World Health Organization (2018e), non-communicable (i.e., chronic) diseases account annually for the deaths of 41 million people worldwide. Over 85 percent of those deaths occur in low- and middle-income countries where they are more likely to target people less than 70 years. To the extent that individuals are able to reduce their risk factors for chronic disease, they therefore improve not only their quality of life, but also the economic health of society.

DISEASES OF THE CARDIOVASCULAR SYSTEM

We begin with **cardiovascular disease**, a term that refers to a set of abnormal conditions that develop in the heart and arteries. The number one cause of death worldwide, cardiovascular disease can also cause chronic disability. Because the distribution of blood throughout the body is essential for the normal functioning of all other organ systems, cardiovascular disease can have a widespread range of effects on the individual's health and everyday life.

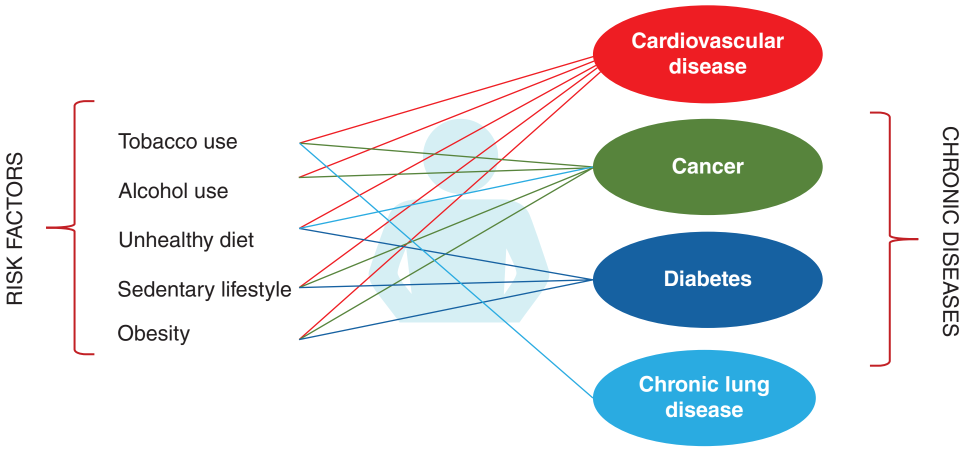
Cardiac and Cerebrovascular Conditions

Chronic diseases that fall into the category of cardiac and cerebrovascular conditions are linked by the fact that they involve disturbances of the cardiovascular system.

As we described in Chapter 4, fat and other substances accumulate in the walls of the arteries throughout the body as a part of the normal aging process. One of the most pervasive is **atherosclerosis**, a term that derives from the Greek words *athero* (meaning paste) and *sclerosis* (meaning hardness). In atherosclerosis, fatty deposits collect at an abnormally high rate, substantially reducing the width of the arteries and limiting the circulation of the blood (see Figure 5.2). **Arteriosclerosis** is a general term for the thickening and hardening of arteries. Everyone experiences some degree of arteriosclerosis as part of normal aging.

FIGURE 5.1

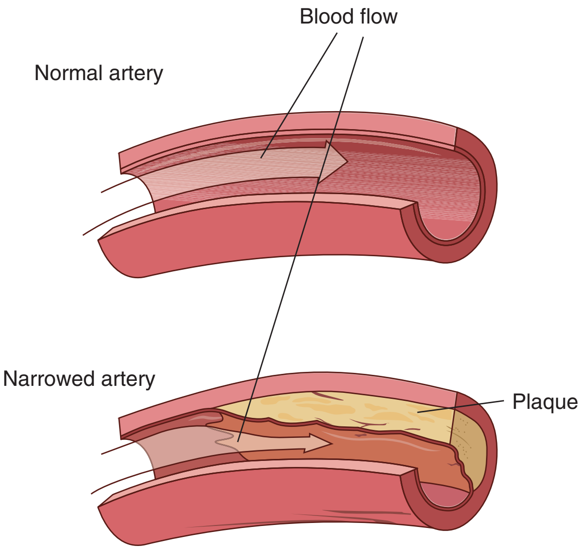
Behavioural Risk Factors for Chronic Diseases in Adulthood



This model shows the relationship between unhealthy behaviours and the development of chronic disease in adulthood.

FIGURE 5.2

Development of Atherosclerosis



Development of atherosclerosis through the buildup of plaque in the arteries.

It is possible to live with atherosclerosis and not encounter significant health problems. However, atherosclerosis can eventually build up so much plaque in a particular artery, causing the blood flow to that part of the body to be blocked. The organs or tissues that are fed by that artery will then suffer serious damage due to the lack of blood supply. When this process affects arteries that feed the heart muscle, the individual is said to have **coronary (ischemic) heart disease**. The term **myocardial infarction** refers to the acute condition in which the blood supply to part of the heart muscle (the myocardium) is severely reduced or blocked.

An individual with **hypertension** suffers from chronic abnormally elevated blood pressure. The technical definition of hypertension is based on two measures of blood pressure. *Systolic* is the pressure exerted by the blood as it is pushed out of the heart during contraction, and *diastolic* is the pressure when the blood is relaxed between beats. Blood pressure is measured in units of "mm Hg," or millimetres of mercury, referring to the display on a blood pressure scale. A person is diagnosed with hypertension when his or her blood pressure is greater than or equal to 140 mm Hg systolic pressure or 90 mm Hg diastolic pressure.

Atherosclerosis contributes to hypertension in the following way. The accumulation of plaque forces the blood to be pushed through narrower and narrower arteries. As a result, the pressure on the blood as it is being pumped out of the heart becomes greater and greater, and the person now is at risk for hypertension.

Hypertension itself creates dangerous changes in the arteries. The more pressure that the blood exerts in its passage through the arteries, the greater the strain on the arteries' delicate walls. Over time, these walls become weakened and inflamed. As they do, they accumulate even more plaque, which tends to settle into those cracks and weak areas. Consequently, the individual's hypertension becomes even more pronounced. This problem is more severe in the larger arteries, particularly the ones leading from the heart, which take the full force of the heart's pumping action.

In addition to damaging the arteries, hypertension has the effect of increasing the workload on the heart. Because the arteries have narrowed, the heart must pump harder and harder to push out the blood. The heart muscle in the left ventricle (the part that pumps out the blood) becomes thickened and overgrown. This hypertrophy of the left ventricle further compromises the health of the cardiovascular system. Referring back to Figure 4.8, you can see normal changes in the left ventricle's wall; these changes are accentuated in the case of cardiovascular disease.

Congestive heart failure (or heart failure) is a condition in which the heart is unable to pump enough blood to meet the needs of the body's other organs. Blood flows out of the heart at an increasingly slower rate, causing the blood returning to the heart through the veins to back up. Eventually, the tissues become congested with fluid. This condition can result from a variety of diseases, including coronary heart disease, scar tissue from a past myocardial infarction, hypertension, disease of the heart valves, disease of the heart muscle, infection of the heart, or heart defects present at birth. People with congestive heart failure are unable to exert themselves without becoming exhausted and short of breath. Their legs may swell due to edema, a condition in which fluid builds up in their bodies. They may also experience fluid buildup in their lungs, along with kidney problems.

The term *cerebrovascular disease* refers to disorders of circulation to the brain. This condition may lead to the onset of a **cerebrovascular accident**, also known as a stroke, an acute condition in which an artery leading to the brain bursts or is clogged by a blood clot or other particle. The larger the area of the brain deprived of blood, the more severe the deterioration of the physical and mental functions controlled by that area. Another condition caused by the development of clots in the cerebral arteries is a **transient ischemic attack (TIA)**, also called a ministroke. The cause of a TIA is the same as that of a stroke, but in a TIA, the blockage of the artery is temporary. The tissues that were deprived of blood soon recover, but chances are that another TIA will follow. People who have had a TIA are also at higher risk of subsequently suffering from a stroke.

Incidence

From 2014 to 2018, heart and cerebrovascular diseases were two of the three leading causes of death in Canada (along with cancer), accounting for about 25 percent of deaths (Statistics Canada, 2020e). In addition, heart attacks and heart failure accounted for two of the five top reasons for hospitalization (Canadian Institutes of Health Research, 2019). According to the Canadian Heart and Stroke Foundation (2020), 9 in 10 Canadians have at least one risk factor for heart disease and stroke, and 80 percent of these conditions are preventable through lifestyle changes.

As mentioned, cardiovascular disease is the leading cause of death worldwide, causing 17.9 million deaths in 2015, or 31 percent of all deaths (World Health Organization, 2017). Eastern Europe has the highest prevalence of deaths from heart disease (adjusted for age) followed by Central Asia and Central Europe. The lowest rates of heart disease are in Central Sub-Saharan Africa, with similar low rates in southern Latin America and the high-income countries in the Asia-Pacific region (Roth et al., 2017).

Behavioural Risk Factors

Lifestyle factors contribute significantly to all forms of heart disease. Even people who have a strong genetic predisposition to cardiovascular disease can decrease (or increase) their risks through the choices they make on a daily basis. Referring back to Figure 5.1, we will now consider each of the four risk factors in terms of cardiovascular disease.

Looking first at tobacco smoking, in 2018, 15.8 percent of Canadians aged 12 and older were smokers (Statistics Canada, 2019k). Tobacco smoking is the leading preventable cause of death, with 100 Canadians dying of a smoking-related disease every day (Reid et al., 2013). Smoking rates for those between the ages of 18 and 64 are quite similar at about 18 percent, decreasing to 10 percent for those aged 65 and older (Statistics Canada, 2020i). It is very possible that smoking rates are lower among seniors—in part, because smokers are less likely to survive. Overall, rates of smoking have declined between 2015 and 2018 (Statistics Canada, 2019k). It is unclear to what extent the increasing popularity of vaping (with its associated risks) and smoking cannabis (legalized in 2018) will contribute to increased health risks.

Although it is not known exactly why smoking increases the risk of heart disease, most researchers believe that smoking damages the arteries, making them more vulnerable to plaque formation and ultimately leading to the deleterious changes we outlined earlier. Research on factors predicting longevity shows that smoking has a more significant impact on the aging process than other behaviours, speeding up the process of DNA methylation (Fiorito et al., 2019).

A sedentary lifestyle is the next major risk factor for heart disease. There is a well-established relationship between exercise and heart disease (Campbell et al., 2019). Combining aerobic exercise and resistance training produces even more beneficial effects on blood pressure and other measures of cardiovascular health and may also produce longer-term adherence (Ruangthai & Phoemsapthawee, 2019). Unfortunately, adults 65 years and older have the highest risk of heart disease but are the least likely to exercise the recommended 150 minutes per week with only 37 percent achieving this recommendation compared to 54 to 64 percent of younger adults (Statistics Canada, 2020f).

An unhealthy diet places the individual at risk of developing a BMI in the overweight or obese range. An analysis of 239 prospective studies conducted in four continents showed a causal relationship between a high BMI and mortality due to vascular disease (Global BMI Mortality Collaboration, 2016). In 2018, over one in four Canadians aged 18 and older were classified as obese, with the highest rates among those aged 35 to 49 and 50 to 64 (Statistics Canada, 2019c). While this is lower than the rates of obesity in the United States, estimated at 39 percent, it is far higher than the worldwide rate of adult obesity, which is 13 percent (Hales et al., 2017; World Health Organization, 2018f). Rates of obesity in Canada are steadily increasing.

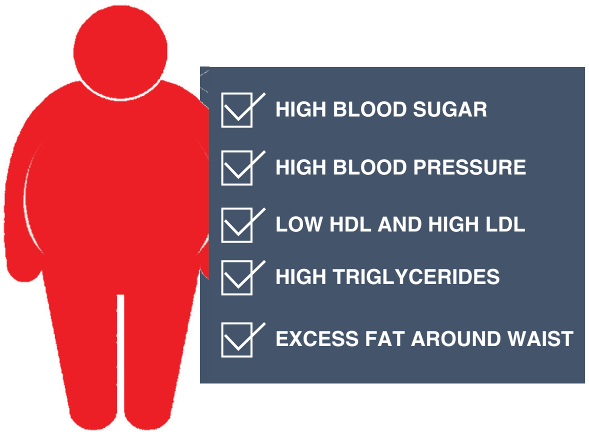
Finally, high intake of alcohol to the point of being harmful is the fourth major risk factor for cardiovascular disease. This is in part because alcohol is high in calories, but also because excessive alcohol use can damage the cardiovascular system and the brain.

As shown in Figure 5.3, **metabolic syndrome** is a term applied to people who have a cluster of symptoms associated with high-risk factors for cardiovascular and related diseases.

The criteria for metabolic syndrome include abdominal obesity, high levels of triglycerides, low levels of HDL ("good"

FIGURE 5.3

Metabolic Syndrome



Metabolic syndrome is a term used to characterize people who show three of the five risk factors illustrated here.

cholesterol), high levels of LDL ("bad" cholesterol), hypertension, and high levels of glucose. According to the American Heart Association and the National Heart, Blood, and Lung Institute, three of these criteria must be present for the person to be considered to have metabolic syndrome (Grundy et al., 2006).

As indicated in Table 5.1, rates of heart disease and stroke are significantly higher among Aboriginal individuals. A recent study examined the risk factors for cardiovascular disease among 1,302 men and women living in eight First Nations communities in Canada (Anand et al., 2019). Using a standard measure of cardiac risk, results indicated that more than 85 percent of individuals were at moderate to high risk for cardiovascular disease. Lower risk was associated with higher socioeconomic advantages, higher educational levels, greater trust between neighbours, and more social support. Higher risk was associated with barriers to accessing routine health care, taking prescription medication, and the inability to pay for prescription medication. The study emphasizes the importance of social determinants of health and the significant barriers to health care experienced by Aboriginal people. In addition, it identifies important risk and protective factors that could address the serious problems of cardiovascular disease in this population.

Prevention of Heart Disease and Stroke

Advances in the understanding of the cause of heart disease and stroke have resulted in safer and more effective medical and dietary supplements, contributing to substantial improvements of mortality rates due to cardiovascular disease. Much of this improvement is due to the widespread use of medications known as statins, which work by lowering the levels of harmful cholesterol (LDL) in the blood. However, in addition to or instead of medication, anyone can benefit from control of diet and participation in exercise as preventive strategies; the earlier you begin to follow these strategies, the better.

Healthy heart diets are high in fruit and vegetable intake (Crowe et al., 2011). The so-called Mediterranean diet is a regimen that includes fruits and vegetables as well as nuts, seeds, whole grains, and olive oil along with minimum intake of red meat and dairy foods with moderate intake of red wine during meals. People who follow this diet have reduced the risk of metabolic syndrome, particularly when combined with high levels of physical activity (Malakou et al., 2018). Additionally, treatments that incorporate relaxation training can help address psychosocial contributors to cardiovascular disease (Tang et al., 2009). Novel approaches to treatment may also incorporate music to aid in relaxation (do Amaral et al., 2016).

As we noted earlier, there are significant national differences in rates of cardiovascular disease. These are almost certainly related to diet. An analysis of the dietary habits and food intake of almost 27,000 people living in the countries of Central and Eastern Europe suggested that poor dietary habits contribute significantly to the high rates of morbidity and mortality in these countries (Boylan et al., 2009). Additionally, psychosocial and socioeconomic factors may contribute further to the high risk for cardiovascular disease in these countries, further exacerbating problems related to unhealthy diets (Tillmann et al., 2017).

It is important to remember in our discussion of available preventive treatments that people are reluctant to change their lifestyle habits, particularly when they must make these changes after decades of unhealthy habits. Health care professionals must therefore not only educate high-risk individuals, but also encourage them to believe that change is possible (Resnick et al., 2009).

CANCER

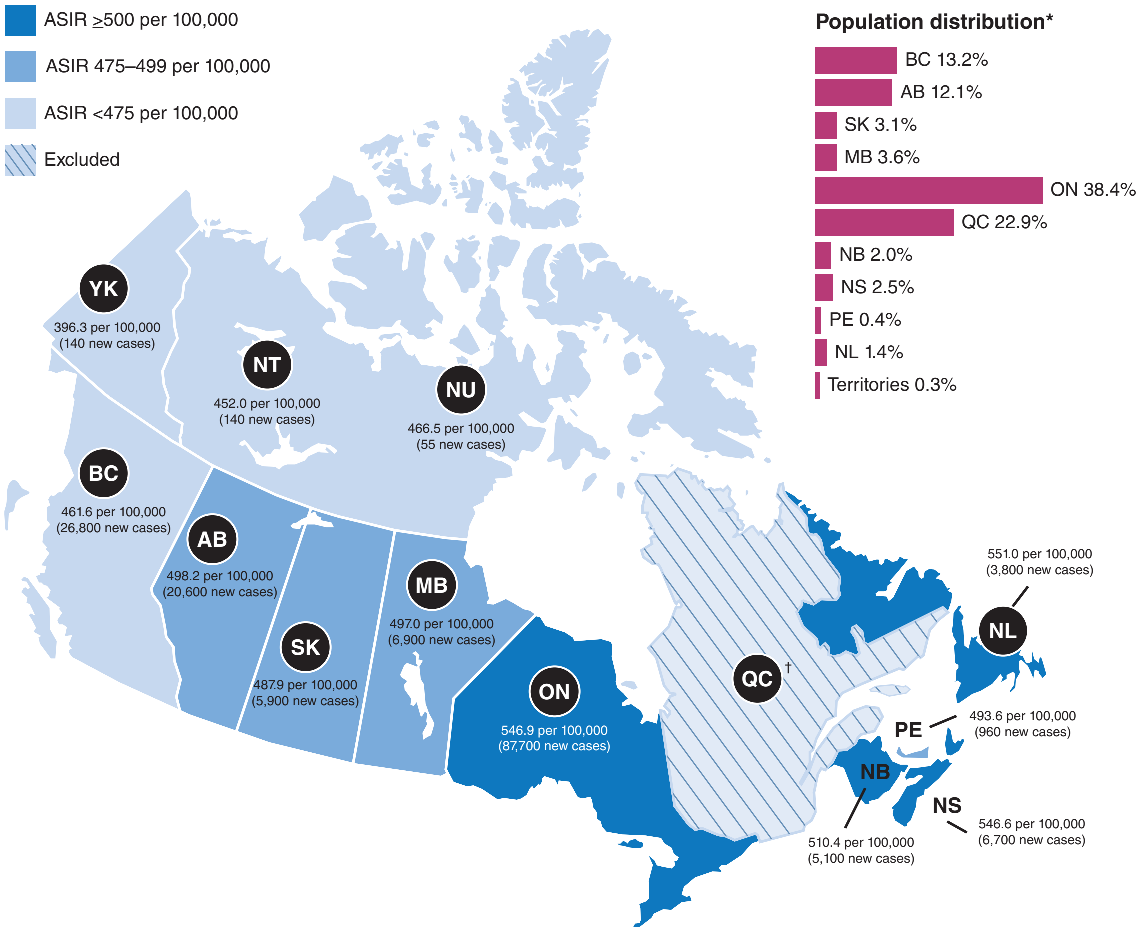
Cancer is a generic term that includes a group of more than 100 diseases. Each type of cancer has its own symptoms, characteristics, treatment options, and overall effect on a person's life and health.

Cancer is the leading cause of death in Canada. Approximately one in two of all Canadians will develop cancer in their lifetime and about one in four will die from the disease (Canadian Cancer Statistics Advisory Committee, 2019). More than half of cancers are lung, breast, colorectal, and prostate (excluding non-melanoma skin cancer). Lung cancer is by far the most lethal, resulting in more deaths than the other three types of cancer combined. On a positive note, mortality due to lung cancer has decreased, leading to an overall decline in cancer death rates by 35 percent in men and 20 percent for women since their peak in 1988. In general, survival rates for cancer vary dramatically. For example, the five-year relative survival rate for thyroid cancer is 98 percent, in contrast to pancreatic cancer at 8 percent. In economic terms, cancer is the fourth-costliest disease in Canada, and, as a result of the aging population, these costs are expected to increase. Figure 5.4 shows the geographic distribution of projected cancer deaths in Canada.

Worldwide, there were 9.6 million deaths from cancer in 2018, with 70 percent of them occurring in low- and middle-income countries. Approximately one-third of cancer deaths around the world are due to the risk factors of high BMI, low intake of fruits and vegetables, sedentary lifestyle, and use of tobacco and alcohol. The most common cancers are lung, breast, colorectal, prostate, skin, and stomach, with the most number of deaths due to lung cancer (World Health Organization, 2018a).

FIGURE 5.4

Geographical Distribution of Projected New Cancer Cases and Age-Standardized Incidence Rates (ASIR) by Province and Territory, Both Sexes, Canada, 2019


ASIR ≥500 per 100,000
ASIR 475–499 per 100,000
ASIR <475 per 100,000
Excluded
Population distribution*
BC 13.2%
AB 12.1%
SK 3.1%
MB 3.6%
ON 38.4%
QC 22.9%
NB 2.0%
NS 2.5%
PE 0.4%
NL 1.4%
Territories 0.3%
YK
396.3 per 100,000 (140 new cases)
NT
452.0 per 100,000 (140 new cases)
NU
466.5 per 100,000 (55 new cases)
BC
461.6 per 100,000 (26,800 new cases)
AB
498.2 per 100,000 (20,600 new cases)
SK
487.9 per 100,000 (5,900 new cases)
MB
497.0 per 100,000 (6,900 new cases)
ON
546.9 per 100,000 (87,700 new cases)
QC †
NL
551.0 per 100,000 (3,800 new cases)
PE
493.6 per 100,000 (960 new cases)
NB
510.4 per 100,000 (5,100 new cases)
NS
546.6 per 100,000 (6,700 new cases)

This figure shows the expected distribution of cancer across Canada in 2019. In general, rates are highest in eastern and central Canada and lowest in western Canada and the territories.

Source: From Canadian Cancer Statistics Advisory Committee. (2019). *Canadian Cancer Statistics 2019: Canadian Cancer Society*. Toronto, ON: Author. Retrieved from https://www.cancer.ca/Canadian-Cancer-Statistics-2019-EN

RISK FACTORS AND PREVENTION

The Canadian Population Attributable Risk of Cancer (ComPARe) study is a partnership between the Canadian Cancer Society and leading Canadian experts in the fields of epidemiology, biostatistics, cancer risk factors, cancer prevention and knowledge translation. As indicated in Figure 5.5, 4 in 10 cancer cases in Canada in 2015 could have been prevented. The top three modifiable risk factors are smoking, physical inactivity, and excess weight.

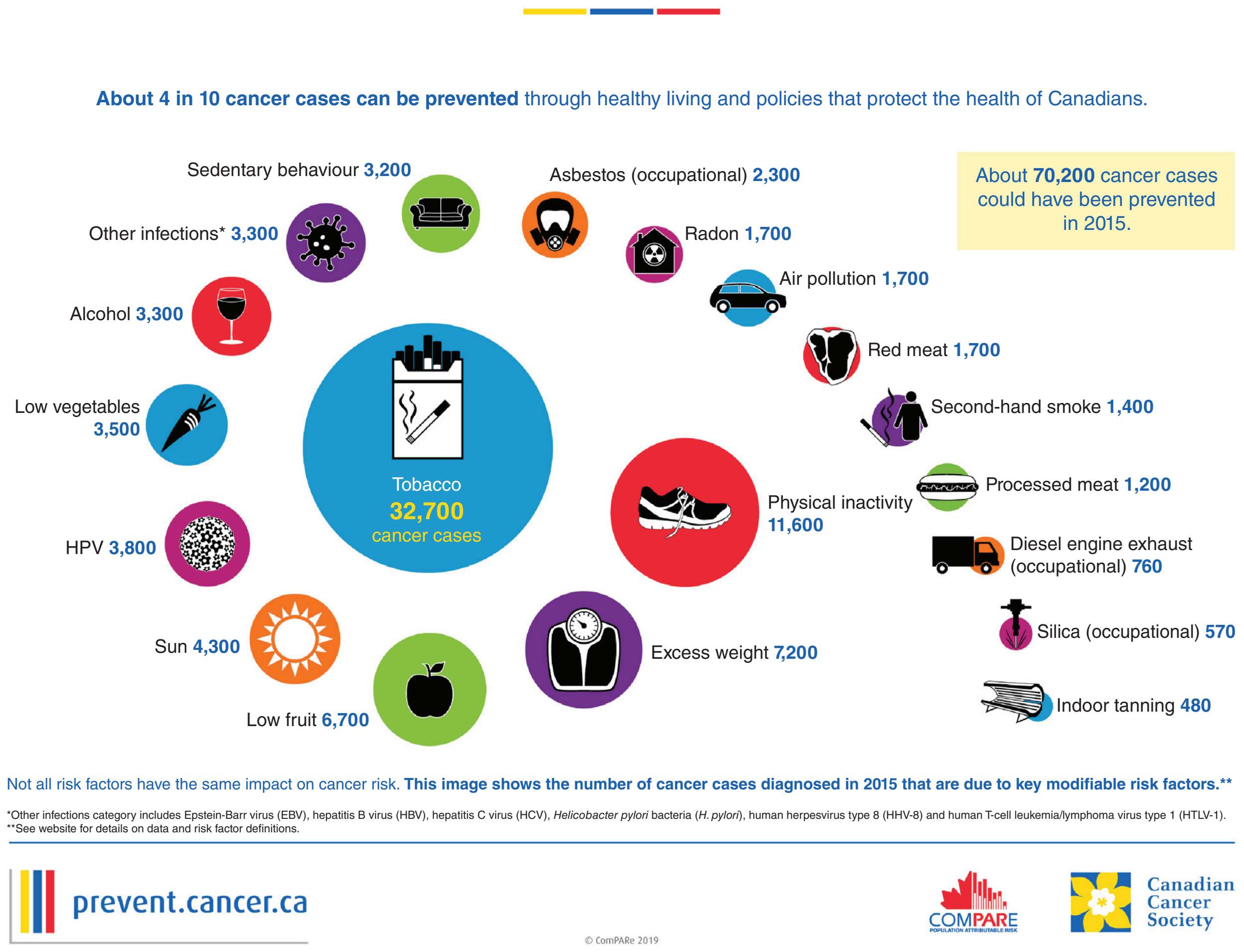
All cancer is genetically caused in the sense that it reflects damage to the genes that control cell replication. Some damage is associated with genetic mutations that people inherit. These inherited risks are particularly important for breast and colon cancer. About 5 percent of women with breast cancer have a hereditary form of this disease. Similarly, close relatives of a person with colorectal cancer are themselves at greater risk, particularly if many people within their extended family have had the disease. However, most cancer is not of the inherited variety. Instead, cancer develops when random mutations occur that cause the body's cells to malfunction. The mutations develop either as a mistake in cell division or in response to injuries from environmental agents such as radiation or chemicals. Thus, cancer is due to an interaction between a person's genetic inheritance and exposure to the harmful risk factors of physical carcinogens (e.g., radiation), chemical carcinogens (e.g., asbestos), or biological carcinogens.

In Canada, residential exposure to radon, a naturally occurring colourless and odourless gas formed from the decay of uranium-238, is a known carcinogen present in colder months, particularly in homes with poor ventilation and on lower levels of residential structures. Approximately 7 percent of lung cancer cases in 2015 were due to residential radon exposure (Gogna et al., 2019b).

Most cancers become more prevalent with increasing age in adulthood because age is associated with greater cumulative

FIGURE 5.5

Number of Cancer Cases That Could Be Prevented in Canada



Source: https://prevent.cancer.ca/wp-content/uploads/2019/05/CMPR_1pgr_NmbrCasesPrev_CA-EN.pdf

exposure to harmful toxins (carcinogens) in the environment. For example, skin cancer is directly linked to exposure to ultraviolet (UV) radiation from the sun. There is concern that as ozone levels in the air are depleted due to global warming, the risk of skin cancer will continue to rise (World Health Organization, 2019c).

However, even as awareness of the need for sunblock as a prevention against skin cancer increases, tanning beds that expose users to artificial sources of UV radiation continue to be in use. Researchers estimate that women in developed countries who use tanning beds before the age of 30 increase their risk of developing skin cancer by 75 percent; despite knowing the risks, women use tanning beds anyway (Farley et al., 2015).

As indicated, according to the ComPARe study, the leading preventable cause of cancer in Canada is smoking tobacco. In 2015, 17.5 percent of cancer cases were due to smoking and an additional 1 percent were due to passive tobacco exposure, that is exposure to second-hand smoke among individuals that have never smoked (Poirier et al., 2019). Smoking is in many ways more dangerous than UV exposure, because the forms of cancer related to cigarettes are generally more lethal than skin cancer. Most lung cancer is caused by cigarette smoking. People who smoke also place themselves at risk of developing cancers of the mouth, throat, esophagus, larynx, bladder, kidney, cervix, pancreas, and stomach. The risk of lung cancer begins to diminish as soon as a person quits smoking. People who had lung cancer and stopped smoking are less likely to get a second lung cancer than are people who continue to smoke.

Although you are probably aware of the risks of cigarette smoke in developed countries such as the United States, Canada, and in European countries, you may not realize that carcinogens are present in substances such as betel quid, which includes the toxic substance areca nut. Over 90 percent of esophageal cancers in the world occur in countries in the "esophageal cancer belt," located in the region from the Caspian Sea to Central Asia to the West Pacific (Chung et al., 2015).

According to the ComPARe study, being physically inactive is the second more important modifiable risk factor among

Canadian adults. Estimates indicate that 50 percent of Canadians engage in low levels of activity. Overall, 5 percent of all cancers can be attributed to physical inactivity; however, this figure increases to 10 percent when these data reflect site-specific cancers that are more strongly related to physical inactivity. The strongest evidence is for breast, colon, endometrial cancer, but emerging evidence suggests that physical inactivity is also related to lung, bladder, kidney, esophagus, and stomach cancers (Friedenrich et al., 2019).

The third more important modifiable risk factor is excess weight, with data clearly indicating that it is related to an increased risk of colorectal, postmenopausal breast, esophageal adenocarcinoma, stomach-cardia, kidney, gallbladder, liver, advanced prostate, ovarian, endometrial, and pancreatic cancers. Researchers in the ComPARe study showed that, in 2015, incident cancers were associated with excess body weight (7.2 percent), excess abdominal adiposity (8.9 percent), and high waist-to-hip ratio (10 percent). Moreover, as you know, obesity rates continue to increase. The researchers showed that if BMI values reverted to 1994 levels, 72,157 cases of cancer could be prevented by 2042 (Brenner et al., 2019).

In addition to smoking, being physically inactive and excess weight, eating specific foods seems to play a role in cancer risk, specifically red and processed meats. Estimates indicate that Canadians eat red meat about 3.2 times per week and processed meat about 1.2 times per week. In Canada, in 2015, the estimated burden of cancer attributable to red meat was 5.9 percent for colorectal cancer, 12.8 percent for male pancreatic cancer, and 5.4 percent for stomach cancer. The corresponding figures for processed meat was 4.3 percent for colorectal, 4.3 percent for non-cardia stomach cancer, 5.7 percent for male pancreatic cancer, and 7.6 percent for esophageal squamous cell carcinoma (Ruan et al., 2019).

Low consumption of fruits and non-starchy vegetables (both defined as less than four per day) has also been linked to greater cancer risk. The World Cancer Research Fund indicates that this level of intake is protective against cancer. The prevalence of low consumption of fruits and vegetables is high among Canadian adults at 80.5 percent and 86.6 percent, respectively (Poirier et al., 2019). Low consumption of fruits has been linked to multiple types of cancer, including esophageal (squamous cell carcinoma) lung, pancreatic, and colorectal cancers. Similarly, low consumption of non-starchy vegetables has been linked to many types of cancers, including esophageal, head and neck, pancreatic, and liver (Poirier et al., 2019). In general, high-fibre diets are protective against colorectal cancer.

There are several additional specific types of environmental toxins in the air, food, and water that make certain people more vulnerable to cancer. Such compounds include asbestos, arsenic, beryllium, cadmium, chromium, and nickel. Exposure to these compounds significantly increases a person's risk of cancer in various sites in the respiratory system, including the lung and nasal cavity. People exposed to arsenic are at risk for bladder cancer, and women exposed to asbestos are more likely to develop ovarian cancer. In addition, people exposed to leather, silica, and wood dust are more likely to develop respiratory cancers (Straif et al., 2009). People in certain occupations are more at risk for exposure to these carcinogenic substances, including those who work in iron and steel founding or manufacturing of isopropyl alcohol, paint, and rubber (Baan et al., 2009). In Canada, workplace exposures such as solar radiation, asbestos, diesel engine exhaust, crystalline silica, and night shift work are related to increased risk of five cancers: mesothelioma, non-melanoma skin cancer, lung, female breast, and urinary bladder (Labrèche et al., 2019).

Cancer can be attributed to other, less well-known factors, such as cancer-causing infections including human papillomavirus virus (HPV), helicobacter pylori, Epstein-Barr, and hepatitis B and C (Volesky et al., 2019). Fine particulate matter found in air pollution has been linked to lung cancer (Gogna et al., 2019a). Finally, alcohol has been identified as a carcinogen and linked to numerous types of cancer. All levels of consumption have been deemed to increase risk for cancer; however, the Canadian Cancer Society (2020) recommends that, if you must drink alcohol, it should be limited to one drink a day for women and two drinks a day for men.

Finally, certain hormones may increase cancer risk, interacting in complex ways with other factors that we have already mentioned. Although the cause of prostate cancer is not known, the growth of cancer cells in the prostate, like that of normal cells, is stimulated by male hormones, especially testosterone. Estrogen in post-menopausal women is thought to increase their likelihood of developing uterine cancer. However, other sources of estrogen, such as the endocrine-disrupting chemicals in certain consumer products (in the form of bisphenol A [BPA]), can also increase women's risk of developing cancer (Rutkowska et al., 2016).

Treatments

The best way to treat cancer is to prevent it by avoiding known carcinogens. People at risk based on their age, sex, and lifestyle should also undergo screenings as recommended by health care professionals. Organizations such as the Canadian Cancer Society and the American Cancer Society publicize the need for tests such as breast self-examination and mammograms for women, prostate examinations for men, and colon cancer screenings for both men and women.

As important as detection is, however, public health officials often change their recommendations for the frequency and nature of cancer screening. The Canadian Task Force on Preventive Health Care (CTFPHC) monitors the scientific developments for a range of health and mental health disorders and regularly updates screening guidelines, including those for cervical cancer in 2013 (CTFPHC, 2013) and breast cancer in 2018 (CTFPHC, 2018). The new breast cancer screening guidelines represent a significant change from earlier versions, advocating no routine screening with mammography for women aged 40 to 49 because of weak scientific evidence. Routine screening with mammography is recommended every two to three years for women aged 50 to 74. Note, however, that these standards do not apply to women with risk factors such as a personal history of breast cancer, and recommendations were not made for women aged 75 and older because of a weak evidence base.

Nevertheless, these new guidelines, which recommend reduced screening, were harshly criticized by advocacy groups and sparked debate in the medical field and the media. An example of this debate was published in the *National Post* on February 12, 2014. The author, Helen Branswell, reported on the results from the 25-year Canadian National Breast Screening Study, which supported the change to screening guidelines, and the vocal opposition from members of the American College of Radiology and Society of Breast Imaging (Branswell, 2014).

In 2009, the U.S. Preventive Services Task Force made similar changes to the breast cancer guidelines. In order to determine the impact of these changes, researchers examined self-reported mammography rates between 2006 and 2010. Although mammography rates declined slightly across all age groups over 40 (adjusted for a variety of demographic factors, including race/ethnicity) in 2010, the differences were not statistically significant (Howard & Adams, 2012). A national telephone survey conducted a year after the revised recommendations were implemented suggested that fewer than half of the women surveyed were aware of the changes in screening guidelines, and that those who were younger and had higher rates of education were more aware of the changes (Kiviniemi & Hay, 2012).

The debate on mammograms continues, however, and was once again in the headlines in 2015 when the American Cancer Society revised its previous guidelines. An important and controversial element of this revision was the advice that women not perform breast self-examination or have these examinations be part of their ordinary physicals with their primary health care provider. The risk now is that the pendulum has swung too far in the direction of insufficient screening, leading to new concerns about failing to detect treatable cancers (Schattner, 2019). Similar concerns as those involving breast cancer occur in guidelines for colon and prostate cancer screening. In each case, physicians and their patients must weigh the risks incurred by undergoing screening (and possibly receiving a false positive) against the failure to detect a treatable cancer.

Depending on the stage of cancer progression at diagnosis, various treatment options are available (see Figure 5.6). Radiation therapy involves the use of high-energy X-rays to damage cancer cells and stop their growth. Surgery is the most common treatment for most types of cancer when it is probable that all of the tumours can be removed. Chemotherapy uses drugs to kill cancer cells. Patients are most likely to receive chemotherapy when the cancer has metastasized to other parts of the body. Targeted drug therapies aim at cancer's specific genes, proteins, or the tissue that contributes to cancer growth and survival.

As more information is gathered through the rapidly evolving program of research on cancer and its causes, new methods of treatment and prevention can be expected to emerge over the next few decades. Furthermore, as efforts grow to target populations at risk for the development of preventable cancers (such as lung cancer), we can expect that cancer deaths will be reduced even further in the decades ahead.

DISORDERS OF THE MUSCULOSKELETAL SYSTEM

Musculoskeletal diseases include a range of conditions that develop in the bones and joints. Not fatal in and of themselves, these diseases can be crippling and may lead to injury or bodily harm that can eventually lead to the death of the afflicted individual.

Osteoarthritis

Arthritis is a general term for conditions affecting the joints and surrounding tissues that can cause pain, stiffness, and swelling in joints and other connective tissues. **Osteoarthritis**, the most common form of arthritis, affects joints in the hips, knees, neck, lower back, and small joints of the hands. These are joints vulnerable to injuries that people sustain through repeated overuse in the performance of a particular job or a favourite sport. The diagram in Figure 5.7 illustrates arthritic changes in the knee. The impact from injury and repeated use of the joints contributes to osteoarthritis by thinning or wearing away the cartilage that cushions the ends of the bones in the joint as they rub together. The synovial fluid that fills the joint loses its shock-absorbing properties as well, further contributing to the development of osteoarthritis. Bony spurs and joint swelling also develop as the disease progresses. These changes in the joint structures and tissues cause the individual to experience pain and loss of movement. People who are overweight or obese are at further risk for osteoarthritis, particularly in the lower joints that must support their extra weight.

Because osteoarthritis has no cure, people who develop this disease require pain management. Medications used to help alleviate the pain of osteoarthritis include aspirin, acetaminophen, ibuprofen, and non-steroidal anti-inflammatory drugs (NSAIDs). Although these medications can help alleviate the individual's pain, NSAIDs can create their own set of problems. People who take NSAIDs on a chronic basis are at risk for kidney disease as well as ulcers. Another strategy is to inject corticosteroids directly into joints to reduce swelling and inflammation. These drugs are used sparingly, however, because they can themselves destroy bones and cartilage.

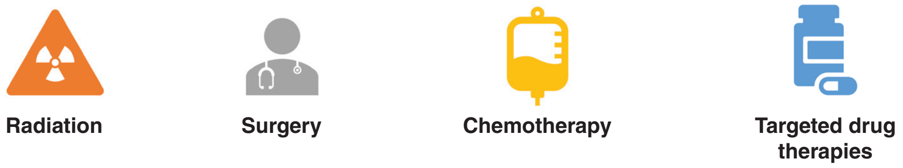


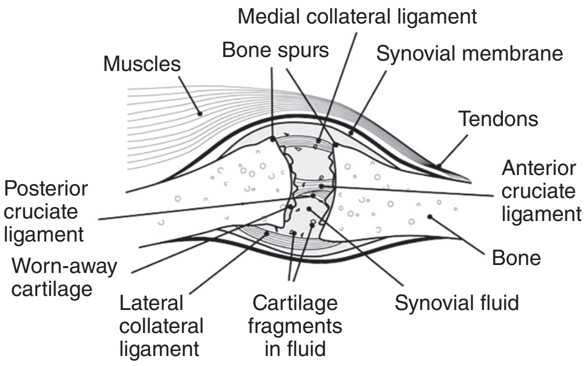
FIGURE 5.6

Forms of Cancer Treatment

Cancer treatments currently include these four methods, with targeted drug therapies becoming better refined through research.

FIGURE 5.7

A Joint with Severe Osteoarthritis


Medial collateral ligament
Bone spurs
Synovial membrane
Muscles
Tendons
Anterior cruciate ligament
Posterior cruciate ligament
Bone
Worn-away cartilage
Lateral collateral ligament
Cartilage fragments in fluid
Synovial fluid

As shown in this diagram of the knee, osteoarthritis creates pain and stiffness due to wearing away of the cartilage and accumulation of bone spurs.

Even the best pain medications only alleviate symptoms; they do not provide a cure for the disease. More active forms of treatment for osteoarthritis are increasingly becoming available. One approach is to receive an injection of a synthetic material into an arthritic joint to replace the loss of synovial fluid. A second option is to be injected with sodium hyaluronate directly into the joint, a version of a chemical normally present in high amounts in joints and fluids.

When these pain or injectable treatments no longer produce relief, the individual with osteoarthritis may undergo the total replacement of the affected joint. Although hip or knee replacement surgery may seem like a drastic measure, it is one that typically proves highly satisfactory. Following the surgery, many individuals are not only able to lead pain-free lives, but are also able to resume some of their former activities.

Exercise can also help to reduce the pain of osteoarthritis, but it must be geared to the individual's ability, perhaps requiring less extensive bouts throughout the course of the day rather than one intense exercise session (Kraus et al., 2019). The best exercise for osteoarthritis helps the individual strengthen the muscles around the joint (Verweij et al., 2009) and stretch the tendons. Swimming is another form of exercise that can help offset the pain and limitations of osteoarthritis (Alkatan et al., 2016). People whose osteoarthritis is made worse by their obesity can also benefit from a program of exercise that focuses on weight loss. Another benefit of exercise is that it can offset the effects on mood of the chronic pain associated with osteoarthritis.

Osteoporosis

As we saw in Chapter 4, people steadily lose bone mineral content throughout the decades of adulthood. This loss of bone mineral content occurs because of an imbalance between the rates of bone resorption and bone growth. **Osteoporosis** (literally, "porous bone") is said to occur when the bone mineral density reaches a point that is more than 2.5 standard deviations below the mean of young, white, non-Hispanic women.

As many as 2 million Canadians live with osteoporosis, and one in three women and one in five men will suffer an osteoporotic fracture in their lifetime (Osteoporosis Canada, 2020). To illustrate the magnitude of the problem, fragility fractures, as they are known, are more common than heart attack, stroke, and breast cancer combined, and 28 percent of women and 37 percent of men who have a hip fracture will die within the following year (Osteoporosis Canada, 2020). Women (particularly post-menopausal women) are at higher risk than men because they have lower bone mass in general. However, osteoporosis is a significant health problem in men. Women vary by race and ethnicity in their risk of developing osteoporosis; women of European and Asian descent have the highest risk, whereas black and Hispanic people have the lowest risk. In addition, women who have small bone structures and are underweight have a higher risk for osteoporosis than heavier women.

Excessive use of alcohol and a history of cigarette smoking increase an individual's risk of developing osteoporosis. Conversely, people can reduce their risk by taking in adequate amounts of calcium present in dairy products, dark green leafy vegetables, tofu, salmon, and foods fortified with calcium, such as orange juice, bread, and cereal (a regimen similar to that recommended to prevent heart disease). Other dietary measures include eating foods high in protein and nutrients such as magnesium, potassium, vitamin K, several B vitamins, and carotenoids. Vitamin D, obtained through exposure to sunlight (while wearing sunblock, of course!) or as a dietary supplement, is another important preventive agent. Exercise and physical activity are also significant factors in reducing a person's risk of osteoporosis, particularly when that exercise involves resistance training with weights (Rizzoli et al., 2014).

Once an individual develops osteoporosis, there are a variety of medications currently available to slow or stop bone loss, increase bone density, and reduce fracture risk. The bisphosphonate known as alendronate is a medication used to increase bone density. Unfortunately, it can have serious side effects, particularly bone loss in the jaw. In severe cases, individuals have no choice other than to take these medications. To minimize the side effects of the medications, such individuals can benefit from a "drug holiday," as the medications have long-lasting effects (Villa et al., 2016). The naturally occurring hormone calcitonin may also be given to help regulate calcium and bone metabolism, but its use is no longer recommended (Osteoporosis Canada, 2013). Conversely, there is some evidence that intake of dietary silicon can help promote bone regeneration (Rodella et al., 2014).

Osteoporosis Canada is committed to the screening, diagnosis, and treatment of the disease, including the use of bone mineral density tests for those who are at risk. One Canadian study indicated that 10.1 percent of the population, 40 years and older, reported a diagnosis of osteoporosis; however, although the majority reported taking vitamin D, calcium supplements, or a medication, fewer than 40 percent engaged in the regular physical activity that is recommended for preventing fragility fractures (O'Donnell, 2018).

In summary, osteoporosis is a potentially disabling condition that limits an older individual's ability to carry out daily tasks without pain or restriction. However, new methods of prevention and treatment are making it possible to reverse or at least stave off the disease.

DIABETES

People with **diabetes** are unable to metabolize glucose, a simple sugar that is a major source of energy for the body's cells. **Adult-onset diabetes**, also known as **type 2 diabetes**, develops over time, gradually reducing the individual's ability to convert dietary glucose to a form that can be used by the body's cells.

Characteristics of Diabetes

Normally, the digestive process breaks food down into components that can be transported through the blood to the cells of the body. The presence of glucose in the blood stimulates the beta cells of the pancreas to release insulin, a hormone that acts as a key at the cell receptors within the body to "open the cell doors" to let in the glucose. Excess glucose is stored in the liver or throughout the body in muscle and fat, at which point its level in the blood returns to normal.

In type 2 diabetes, the pancreas produces some insulin, but the body's tissues fail to respond to the insulin signal, a condition known as insulin resistance. Because the insulin cannot bind to the cell's insulin receptors, the glucose cannot be transported into the body's cells to be used. Eventually, the excess glucose overflows into the urine and is excreted. The body therefore loses a main source of energy, while large amounts of glucose remain in the blood.

The symptoms of diabetes include fatigue, frequent urination (especially at night), unusual thirst, weight loss, blurred vision, frequent infections, and slow healing of sores. If blood sugar levels dip too low (a condition known as hypoglycemia), the individual can become nervous, jittery, faint, and confused. The only way to correct this condition is for the individual to eat or drink a sugary substance as quickly as possible. Alternatively, in hyperglycemia, when blood glucose levels become too high, the person can also become seriously ill. Type 2 diabetes is associated with long-term complications that affect almost every organ system, contributing to blindness, heart disease, stroke, kidney failure, the necessity for limb amputations, and damage to the nervous system.

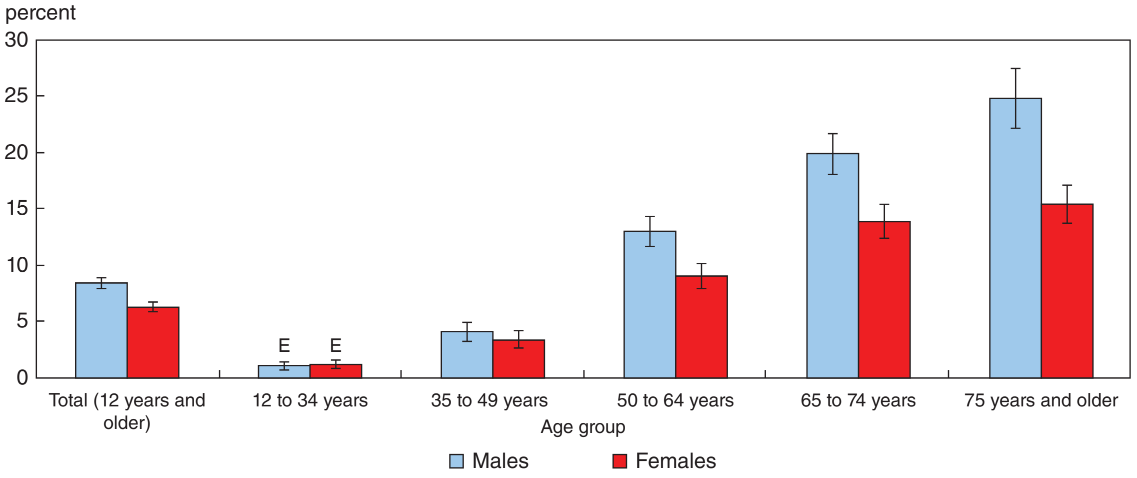
Incidence and Risk Factors

Statistics Canada (2018b) indicates that the prevalence of diabetes is 7 percent for the total population and increases significantly with age (see Figure 5.8). Rates are higher among those whose BMI scores put them in the obese and overweight categories at 13.7 percent and 6.8 percent, respectively, compared to those of normal weight (3.6 percent). Prevalence figures increase sharply to 29 percent when rates of impaired glucose tolerance, or prediabetes as it is known, and undiagnosed diabetes are included (Diabetes Canada, 2019). As the population ages, these rates are expected to increase. Diabetes is associated with multiple health and mental health complications, including premature mortality, cardiovascular disease, kidney failure, non-traumatic lower limb amputations, foot ulceration, blindness, and depression (Diabetes Canada, 2019). Unfortunately, the cost of medications and devices (e.g., insulin pumps) is high and represents a significant financial burden to those affected by the disease.

According to the World Health Organization, the global prevalence of diabetes is estimated to be 8.5 percent, having risen from 4.7 percent in 1980. Approximately 1.6 million

FIGURE 5.8

Diabetes, by Age Group and Sex, Population Aged 12 and Older, Canada, 2017



^{E} use with caution

This is the percent of the population in each age group that have been diagnosed by a health professional as having diabetes.

Source: Statistics Canada. (2018b). *Health fact sheets: Diabetes, 2017*. (Catalogue no. 82-625-X). Ottawa, ON: Author. Retrieved from https://www150.statcan.gc.ca/n1/en/pub/82-625-x/2018001/article/54982-eng.pdf?st=ZcFL1-Kf deaths in 2016 were estimated to be due to diabetes (World Health Organization, 2018b). Countries in the eastern Mediterranean region showed the most precipitous rise in diabetes prevalence between 1980 and 2014, but all regions of the world showed at least a doubling as well.

Diabetes can be understood in terms of the biopsychosocial perspective in that it involves physical, behavioural, and sociocultural risk factors noted earlier in the chapter as risk factors for heart disease. Researchers in this area warn that older adults are becoming increasingly likely to experience metabolic syndrome, insulin resistance, high lipid levels, and hypertension, leading to greater risk of cardiovascular and kidney disease (Grundy, 2016).

Ethnicity also contributes to diabetes risk. In Canada, people of South Asian, Hispanic, Arab, Chinese, Asian, and African ancestry are at higher risk of developing type 2 diabetes than those of European descent. The Diabetes 360° strategy, a national framework for improving prevention, screening, treatment, and patient outcomes for diabetes, notes the need for culturally sensitive initiatives. These include prevention strategies such as advocating for a culturally appropriate diet and screening tools, culturally relevant care, and self-management information in the relevant languages (Diabetes Canada, 2019). Moreover, risk factors for diabetes also vary by ethnicity. For example, rates of obesity are lower among Chinese-Canadians than Caucasian-Canadians. South Asians have higher rates of physical inactivity than Caucasians.

Clinical practice guidelines address the urgent need for addressing type 2 diabetes in Aboriginal people in Canada (Crowshoe et al., 2018). In Canada, age-standardized prevalence rates for diabetes are 17.2 percent among those living on-reserve with somewhat lower rates among those living off-reserve, at 10.3 percent (Public Health Agency of Canada, 2011). Inuit people have rates that are equivalent to the general Canadian population. Aboriginal people are diagnosed at a younger age, and they experience greater severity, more complications from the disease and have poorer treatment outcomes. In particular, women are at greater risk because diabetes complicates pregnancy due to the high incidence of hyperglycemia and maternal obesity (Crowshoe et al., 2018). Prevention and intervention strategies among Aboriginal people require an understanding of the complex historical, cultural, and social contexts that affect health in this population.

Prevention and Treatment

In Canada, the Diabetes 360° strategy calls for a comprehensive national framework to address the diabetes epidemic (Diabetes Canada, 2019). Given the clear relationship between obesity and diabetes, the most important means of preventing type 2 diabetes include the control of glucose intake, blood pressure, and blood lipids with exercise and weight control. People with diabetes require frequent testing, usually accomplished by measuring blood levels. Depending on the severity, once an individual has type 2 diabetes, diet and exercise may be sufficient to control its symptoms. If not, then the individual requires insulin injections or oral forms of diabetes medications. Additionally, people with diabetes need to be aware of the potential interaction of their treatment with any over-the-counter medications they use for other conditions, including herbal remedies, NSAIDs, and cough and cold medicines (Taylor, 2017).

RESPIRATORY DISEASES

The main form of respiratory disease affecting adults in middle and late life is **chronic obstructive pulmonary disease (COPD)**, a group of diseases that involve obstruction of the airflow into the respiratory system. Two related diseases—chronic bronchitis and chronic emphysema—often occur together in this disease (see Figure 5.9). People with COPD experience coughing, excess sputum, and difficulty breathing even when they carry out relatively easy tasks, such as putting on their clothes or walking on level ground.

Chronic bronchitis is a long-standing inflammation of the bronchi, the airways that lead into the lungs. The inflammation of the bronchi causes an increase in mucus and other changes, which in turn lead to coughing and expectoration of sputum. People with chronic emphysema are more likely to develop frequent and severe respiratory infections, narrowing and plugging of the bronchi, difficulty breathing, and disability.

Chronic emphysema is a lung disease that causes permanent destruction of the alveoli. Elastin within the terminal bronchioles is destroyed, causing the airways to lose their ability to become enlarged during inspiration and to empty completely during expiration. The result is that the exchange of carbon dioxide and oxygen becomes compromised. People with COPD experience this situation as shortness of breath, making it difficult for them to complete the tasks of daily life (Johansson et al., 2019).

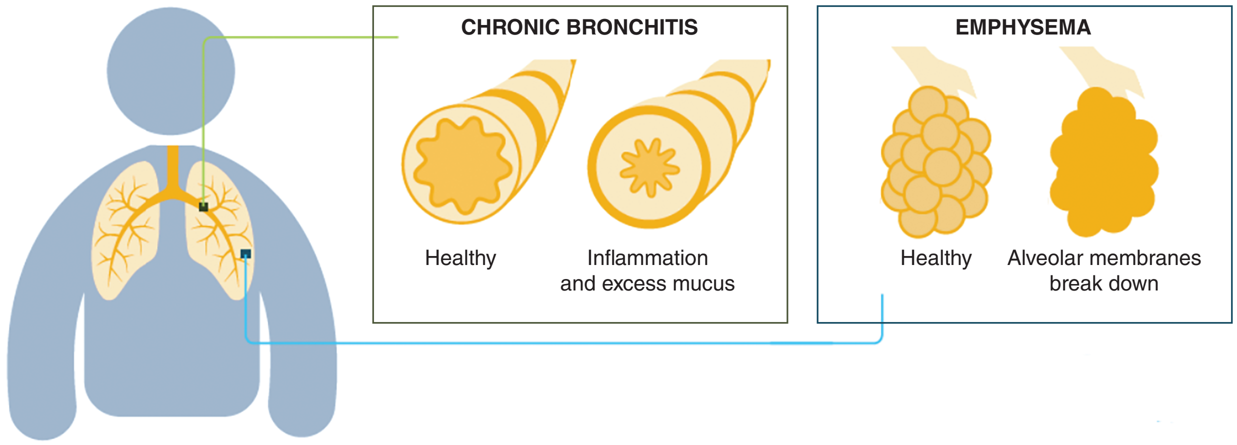
Although the cause of COPD is not known, most who study the disease generally agree that its main cause is cigarette smoking. Exposure to environmental toxins such as air pollution and harmful substances in the occupational setting may also serve as contributing causes.

The specific mechanism involved in the link between smoking and emphysema is thought to involve the release of an enzyme known as **elastase**, which breaks down the elastin found in lung tissue. Cigarette smoke stimulates the release of this enzyme and results in other changes that make the cells of the lung less resistant to elastase. Normally there is an inhibitant of elastase found in the lung, known as alpha-1 antitrypsin (AAT). However, cigarette smoke inactivates AAT and allows the elastase to destroy more lung tissue. Of course, not all smokers develop COPD, and not all people with COPD are or have been smokers. Heredity may also play a role. There is a rare genetic defect in the production of AAT in about 2 to 3 percent of the population that is responsible for about 5 percent of all cases of COPD.

Apart from quitting smoking, a necessary first step in prevention and treatment, individuals with COPD can benefit from medications and treatments. These include inhalers that open the airways to bring more oxygen into the lungs or reduce inflammation, machines that provide oxygen, or, in extreme cases, lung surgery to remove damaged tissue. As suggested by

FIGURE 5.9

Chronic Obstructive Pulmonary Disease



COPD is a chronic respiratory disease that is composed of chronic bronchitis and emphysema.

preliminary studies, individuals with COPD may also benefit from using a handheld device known as a SpiroTiger that provides stimulation to the respiratory muscles (Wlodarczyk & Barinow-Wojewodzki, 2015). Such an approach would be of obvious benefit in building respiratory fitness.

NEUROCOGNITIVE DISORDERS

People receive the diagnosis of **neurocognitive disorder** when they experience a loss of cognitive function severe enough to interfere with normal daily activities and social relationships. You may be familiar with the term **dementia**, which is also used in common speech to refer to a loss of cognitive abilities. Clinicians distinguish major neurocognitive disorder from mild neurocognitive disorder, which, like the term **mild cognitive impairment (MCI)**, refers to a form of neurocognitive disorder that signifies that the individual may be at risk for developing Alzheimer's disease.

People who suffer from **amnesia** have as their main symptom profound memory loss. Their amnesia may involve an inability to learn or remember information encountered after the damage (anterograde—into the future) or the inability to recall information learned prior to the damage (retrograde—going back into the past). Amnesia can be caused by chronic substance use, medications, exposure to environmental toxins, head trauma, loss of oxygen supply to the brain, or the sexually transmitted disease of herpes simplex.

Alzheimer's Disease

Alzheimer's disease is a form of neurocognitive disorder in which the individual suffers progressive and irreversible neuronal death. Over the years, Alzheimer's disease has had a variety of names, including senile dementia, presenile dementia, senile dementia of the Alzheimer's type, and organic brain disorder.

Identified as a disease in 1906, Alzheimer's disease is named after Alois Alzheimer (1864–1915), the German neurologist who was the first to link changes in brain tissue with observable symptoms. Alzheimer treated Auguste Deter, a woman in her 50s who suffered from progressive mental deterioration marked by increasing confusion and memory loss. Taking advantage of what was then a new staining technique, he noticed an odd disorganization of the nerve cells in her cerebral cortex. In a medical journal article published in 1907, Alzheimer speculated that these microscopic changes were responsible for Auguste Deter's dementia. The discovery of brain tissue samples from this patient later confirmed that these changes were similar to those seen in the disease (Enserink, 1998). In 1910, as a resulting number of autopsies from severely demented individuals showed the same abnormalities, a foremost psychiatrist of the era, Emil Kraepelin (1856–1926), gave the name described by his friend Alzheimer to the disease.

Prevalence. The World Health Organization estimates a prevalence of all forms of neurocognitive disease (dementia) among those aged 60 and over at 5 to 8 percent, with 60 to 70 percent being due to Alzheimer's disease. Slightly over half of these (58 percent) live in low- and middle-income countries (World Health Organization, 2019a).

In 2018, the Canadian Institute for Health Information (CIHI) reported that the prevalence of dementia, including Alzheimer's disease, doubles every five years with a low of 1 percent for those ages 65 to 69 to 25 percent for those ages 85 and over. As the Canadian population ages, rates of dementia are expected to more than double over the next 20 years. By 2031, the annual health care costs associated with the disease will increase to $16.6 billion, a significant increase over the cost of $8.3 billion two decades ago. In 2019, with the passing of Bill C-233, Canada became the 30th country to launch a national dementia strategy (CIHI, 2018).

Incidence and prevalence statistics for dementia vary considerably, in part because of different sampling techniques and the way in which disorders are defined. For example, generalizing from relatively small and sometimes unrepresentative samples has characterized much of the prevalence research and thus has led to disputes among researchers about the validity of the estimates. In addition, some prevalence estimates include all forms of neurocognitive disorder, while others include only Alzheimer's cases. Prospective studies that follow individuals over time support the interpretation that U.S. prevalence statistics are biased by the inclusion of non-Alzheimer's patients. In one such study, the autopsied brains of 553 individuals diagnosed in life as having Alzheimer's disease were found, upon autopsy, to have another neurocognitive disorder (Shim et al., 2013). Similarly, research based on the long-term Framingham (MA) Heart Study (Satizabal et al., 2016) carefully distinguished among causes of dementia across four successive groups of older adults studied between 1977 and 2008. Reporting on incidence (new cases), the Satizabal et al. study showed that vascular dementia and Alzheimer's disease both decreased over the three-decade period. At the same time the overall cardiovascular health of participants improved, the cohorts studied were successively better educated. Earlier studies on Alzheimer's disease prevalence in the United States might not only have failed to differentiate forms of neurocognitive disorder but also failed to account for educational influences on prevalence estimates.

The distinction between Alzheimer's disease and other forms of neurocognitive disorder is an important one. Other forms of neurocognitive disorder are different in their cause, prognosis, and treatment. They may even be preventable, as you will soon learn.

From a sociocultural point of view, what the public hears about the prevalence of Alzheimer's disease is important because this information shapes people's attitudes about their own cognitive functioning. People who see these statistics may inaccurately conclude that they are doomed to develop the disorder and that there is nothing they can do to prevent it. In fact, not all neurocognitive disorders have the same inexorable progression as does Alzheimer's disease, and some can be prevented.

Psychological Symptoms. The psychological symptoms of Alzheimer's disease evolve gradually over time. The earliest signs are occasional loss of memory for recent events or familiar tasks. Changes in personality and behaviour eventually become evident as the disease progresses. By the time the disease has entered the most advanced stage, the individual has lost the ability to perform even the simplest and most basic of everyday functions.

The rate of progression in Alzheimer's disease varies from person to person, but there is a fairly regular pattern of loss over the stages of the disease. The survival time following the diagnosis is 4.2 years for men and 5.7 for women on average, but is shorter for individuals with more severe cognitive impairment at the time of diagnosis (Larson et al., 2004).

Biological Changes. One of the most pervasive changes to occur in the brain of a person with Alzheimer's disease is the formation of abnormal deposits of protein fragments known as **amyloid plaques**. Amyloid is a generic name for protein fragments that collect together in a specific way to form insoluble deposits (meaning that they do not dissolve). The form of amyloid most closely linked with Alzheimer's disease consists of a string of 42 amino acids and is therefore referred to as **beta-amyloid-42**.

Beta-amyloid is formed from **amyloid precursor protein (APP)**, a protein found naturally in the brain. As APP is manufactured, it embeds itself in the neuron's membrane. A small piece of APP is lodged inside the neuron, and a larger part of it remains outside. In healthy aging, the part of APP remaining outside the neuron is trimmed by enzymes called **secretases**, so that it is flush with the neuron's outer membrane. In Alzheimer's disease, something goes wrong with this process so that the APP is snipped at the wrong place, causing beta-amyloid-42 to form. The fragments that have been cut off eventually clump together into beta-amyloid plaques, the abnormal deposits that the body cannot dispose of or recycle (see Figure 5.10).

The second major change to occur in the brain is a profusion of abnormally twisted fibres within the neurons themselves, known as **neurofibrillary tangles** (literally, tangled nerve fibres). It is now known that the neurofibrillary tangles are made up of a protein called **tau** (see Figure 5.11), which seems to play a role in maintaining the stability of the microtubules that form the internal support structure of the axons. The microtubules are like train tracks that guide nutrients from the cell body down to the ends of the axon. The tau proteins are like the railroad ties or crosspieces of the microtubule train tracks. In Alzheimer's disease, the tau is changed chemically and loses its ability to separate and support the microtubules. With their support gone, the tubules begin to wind around each other and can no longer perform their function. This collapse of the transport system within the neuron may first result in malfunctions in communication between neurons and may eventually lead to the death of the neuron.

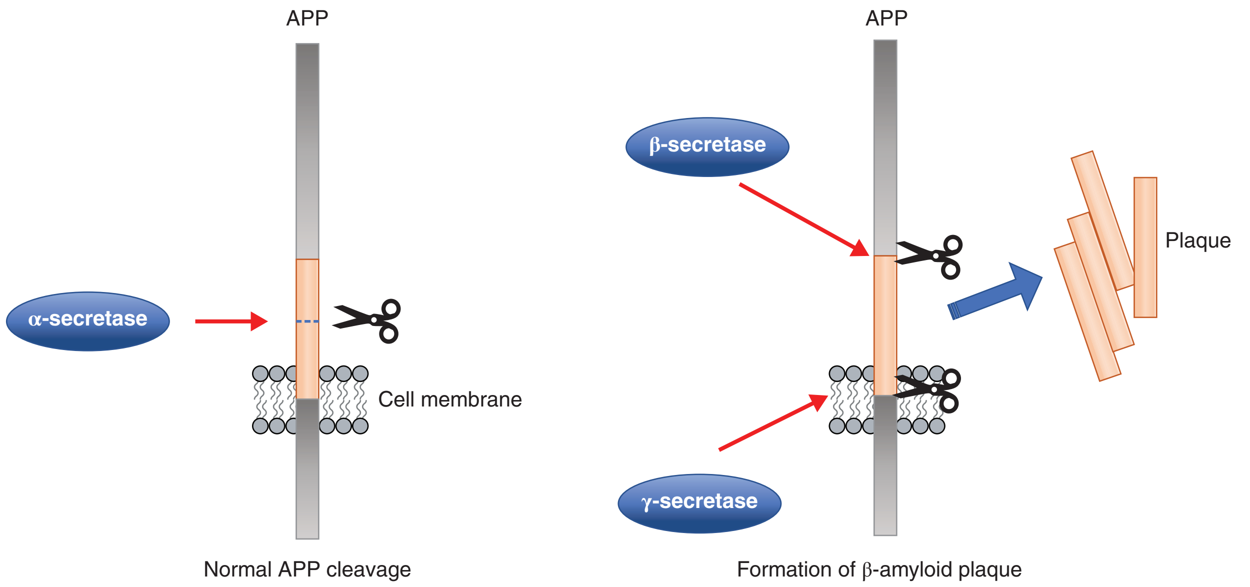
Proposed Causes. The theory guiding most researchers is that genetic abnormalities are somehow responsible for the neuronal death that is the hallmark of Alzheimer's. The genetic theory began to emerge as an explanation after the discovery that certain families seemed more prone to a form of the disease that struck at the relatively young age of 40 to 50 years. These cases are now referred to as **early-onset Alzheimer's disease**. Although the situation is tragic for the afflicted individuals, geneticists have learned a tremendous amount from studying their DNA.

Since the discovery of the early-onset form of the disease, genetic analyses have also provided evidence of a large number of genes potentially numbering as many as 21 that can individually or in combination increase the likelihood of developing the form of Alzheimer's disease that starts at the more conventional age of 60 or 65 years. This form of the disease is called **late-onset Alzheimer's disease**.

One of the prime genes thought to be involved in the late-onset familial pattern is the **apolipoprotein E (ApoE) gene**, located on chromosome 19. **ApoE** is a protein that

FIGURE 5.10

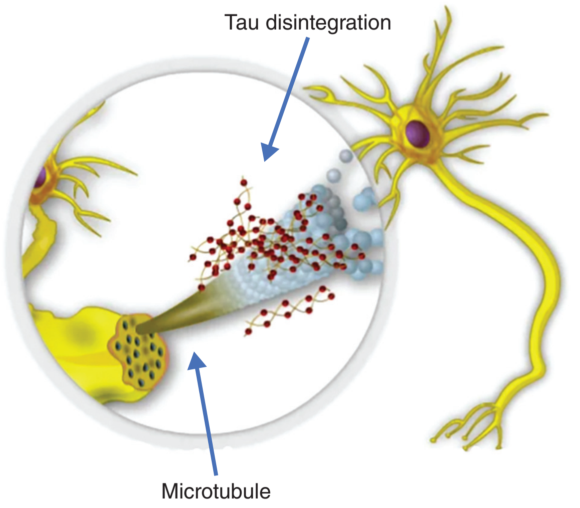
Plaque Formation in Alzheimer's Disease



Normal cleavage of APP occurs when it is snipped by α-secretase, releasing a neuroprotective fragment along with the snipped APP. In the formation of a plaque, the snipping by β-secretase and γ-secretase results in abnormal cleavage and the production of plaques.

FIGURE 5.11

Neurofibrillary Tangle Formation in Alzheimer's Disease



Neurofibrillary tangles are formed when tau disintegrates leading microtubules to become twisted and tangled.

Source: From Mark C. Surles. Reproduced with permission from ScienceMedia, Inc.

carries cholesterol throughout the body, but it also binds to beta-amyloid, possibly playing a role in plaque formation. A host of other genes have been proposed, perhaps as many as 21, which can individually or in combination be involved in the disease. The newer approaches to understanding the genetics of Alzheimer's disease use genome-wide association studies to look for genetic associations that may not be predicted by existing theory (Jansen et al., 2019).

Even as inherited contributions to Alzheimer's disease were being identified with the advent of new genetic methods of testing, researchers were also becoming intrigued with the role of environmental contributions. In a unique longitudinal study of aging among the Sisters of Notre Dame, nuns who agreed to donate their brains upon their death were studied while alive. Their cognitive performance was related to autopsies of their brains after they died. One of the original findings of the study was that despite the appearance of plaques and tangles on autopsy, many of the sisters did not show symptomatic deficits in cognitive performance. More recently, researchers found that higher mental activity in early adulthood seemed to protect the sisters from showing signs of cognitive decline in later life despite the presence of these changes in the brain (Iacono et al., 2015).

Evidence for other protective factors continues to accumulate showing that even people who might be otherwise at risk for Alzheimer's disease never show symptoms during their lifetimes. Exercise is one of these protective factors. In one large study conducted in Japan, a group of highly active older individuals who exercised at least once a week had a lower rate of Alzheimer's disease than did the non-active participants (Kishimoto et al., 2016).

Predicting who will develop Alzheimer's disease, even in genetically at-risk individuals, is a challenging proposition, given the many as yet unknown processes that lead to its development. The good news is that there are protective factors, and as we learn more about what they are and how they operate, even those with a genetic predisposition may be able to take advantage of "nurture" in reducing their chances of developing Alzheimer's disease. Indeed, the improved health of the population may be playing a role in reducing the chances of even genetically susceptible individuals to developing Alzheimer's disease.

Diagnosis. The diagnosis of neurocognitive disorder is in general made when there is significant and progressive cognitive decline in one or more areas including social cognition, memory, **aphasia** (loss of language ability), **apraxia** (loss of ability to carry out coordinated movement), **agnosia** (loss of ability to recognize familiar objects), and disturbance in executive functioning (loss of ability to plan and organize (American Psychiatric Association, 2013).

The diagnosis of Alzheimer's disease through clinical methods is traditionally carried out using the process of exclusion, where other possible diagnoses are systematically ruled out. This is because no one specific test or clinical indicator can definitively identify the disorder. Though methods of diagnosis are improving considerably, it is still the case that only an autopsy will reveal the presence of neurofibrillary tangles and beta-amyloid plaques that are the sure signs of the presence of Alzheimer's disease rather than another form of neurocognitive disorder.

The NINCDS-ADRDA criteria (McKhann et al., 1984) are considered currently to be a gold standard for diagnosing Alzheimer's disease. The acronym stands for National Institute of Neurological and Communicative Disorders and Stroke and Alzheimer's Disease and Related Diseases Association. The criteria are based on medical and neuropsychological screening tests, behavioural ratings, and mental status measures. The NINCDS-ADRDA criteria are said to be 85 to 90 percent accurate in the disease's later stages. Through the continued improvement of brain scanning, the ability to provide a reliable diagnosis in the early to moderate stages of the disorder is becoming ever more likely (Panegyres et al., 2016). Ultimately, as treatments improve, early diagnosis would make it possible for clinicians to intervene and either slow or stop the degeneration of the patient's brain.

Medical Treatments. As researchers continue to make advances in identifying the cause or causes of Alzheimer's disease, the hope is that medications will be found that can reverse its course. Current medications temporarily alleviate memory loss, but they do not slow the progression of the disease (Salloway, 2008).

One category of Alzheimer's medications target **acetylcholinesterase** (also called cholinesterase), the enzyme that normally destroys acetylcholine after its release into the synaptic cleft. The actions of this enzyme seem to reduce the amount of acetylcholine available to the hippocampal neurons, thus leading to memory loss. Anticholinesterase treatments inhibit this enzyme. The anticholinesterase treatments approved by Health Canada for mild to moderate Alzheimer's disease are Aricept, Exelon, and Reminyl (Alzheimer Society of Canada, 2019). By inhibiting the action of acetylcholinesterase, these drugs slow the breakdown of acetylcholine, maintaining it at normal levels in the brain. Aricept and Ebixa are used for moderate to advanced Alzheimer's disease. Ebixa and other drugs in the same category block glutamate from interacting with NMDA receptors in the brain, reducing the toxicity of excess glutamate.

Neither of the major types of medications, either alone or in combination, have shown conclusive scientific evidence for their efficacy. At best, they could only treat symptoms, and only for a limited time as they do not stop disease progression (Stella et al., 2015). There are a number of possible explanations for the failure to demonstrate significant effects of these medications (Schott, 2019), not the least of which may be that pharmaceutical companies are beginning to invest fewer dollars into finding a cure. Additionally, no one disease mechanism has been isolated, and, unlike other medical conditions, the diagnostic criteria are not clearly established.

The side effects of medications used to treat neurocognitive disorders, including Alzheimer's disease, are considerable and can range as high as 37 percent of all patients (Kanagaratnam et al., 2016). These side effects include gastrointestinal effects; dizziness; drowsiness; fainting; frequent or painful urination; headache; joint pain, stiffness, or swelling; depression; unusual bleeding or bruising; weight loss; clumsiness or unsteadiness; confusion; changes in blood pressure; loss of bladder or bowel control; aggression; agitation; delusions; irritability; nervousness; restlessness; tremors; and respiratory difficulties.

Other than medications, a diet rich in antioxidants has long been touted as a way to prevent Alzheimer's. Antioxidants such as ginkgo biloba, melatonin, polyphenols, and vitamins E and C have been proposed to help improve memory and thinking in people with Alzheimer's, although few studies have yet to validate these claims.

Psychosocial Treatments. Given that the pathway to medical treatments is not clearly established, people with this disease and their families must nevertheless find ways to deal on a daily basis with the incapacitating cognitive and sometimes physical symptoms that accompany the deterioration of brain tissue. Clearly, until a cure can be found, mental health workers will be needed to provide assistance in this difficult process, so that the individual's functioning can be preserved for as long as possible.

A critical step in providing conscientious symptom management is for health care professionals to recognize that Alzheimer's disease involves families as much as it does the patients. Family members are most likely to be the ones providing care for the patient, particularly when the patient is no longer able to function independently. This responsibility most likely falls to spouses and their children.

Caregivers are those individuals, usually family, who provide support to people with chronic diseases. They have been the focus of considerable research efforts over the past 30 years. We now know that caregivers are very likely to suffer adverse effects from the constant demands placed on them. The term **caregiver burden** is used to describe the stress that caregivers experience in the daily management of their afflicted relative.

As the disease progresses, caregivers must provide physical assistance in basic life functions, such as eating, dressing, and toileting. As time goes by, the caregiver may experience health problems that make it harder and harder to provide the kind of care needed to keep the Alzheimer's patient at home.

Given the strain placed on caregivers, it should come as no surprise that health problems and rates of depression, stress, and isolation are higher among these individuals than among the population at large. Fortunately, support for caregivers of people with Alzheimer's disease is widely available. Local chapters of national organizations in Canada, such as the Alzheimer Society, provide a variety of community support services for families in general and caregivers in particular. Caregivers can be taught ways to promote independence and reduce distressing behaviours in the patient, as well as to learn ways to handle the emotional stress associated with their role (Piersol et al., 2017).

An important goal in managing the symptoms of Alzheimer's disease is to teach caregivers behavioural methods that will help to maximize the patient's ability to remain independent for as long as possible (see Figure 5.12). The idea behind this approach is that, by maintaining the patient's independence, the caregiver's burden is somewhat reduced. For example, the patient can be given prompts, cues, and guidance in the steps involved in getting dressed and can then be positively rewarded with praise and attention for having completed those steps.

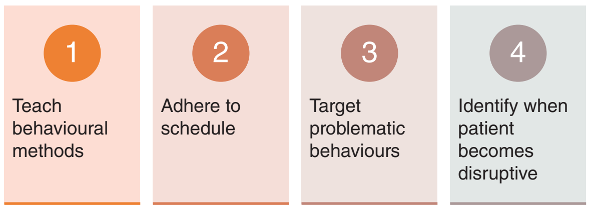
Second, caregivers can also use behavioural strategies to reduce or eliminate the frequency of actions such as wandering or being aggressive. In some cases, this strategy may require ignoring problematic behaviours, with the idea that by eliminating the reinforcement for those behaviours in the form of attention, the patient will be less likely to engage in them. However, it is more likely that a more active approach will be needed, especially for a behaviour like wandering. In this case the patient can be provided with positive reinforcement for not wandering.

Third, caregivers should, as much as possible, operate according to a strict daily schedule. The structure provided by a regular routine of everyday activities can give the patient additional cues to use as guides for which behaviours to carry out at which times of day.

Fourth, the caregiver should identify situations in which the patient becomes particularly disruptive, such as during bathing or riding in the car. In these cases, the caregiver can learn how to identify those aspects of the situation that cause the patient to become particularly upset and then modify them accordingly. For example, if the problem occurs while bathing, it may be that a simple alteration like providing a terry cloth robe rather than a towel will help reduce the patient's feeling of alarm at being undressed in front of others.

FIGURE 5.12

Psychosocial Treatments


1
Teach behavioural methods
2
Adhere to schedule
3
Target problematic behaviours
4
Identify when patient becomes disruptive

Four behavioural methods to help caregivers of patients with Alzheimer's disease.

It is also important for caregivers to understand what to expect as the disease progresses. In a study of more than 300 nursing home patients with advanced neurocognitive disorder, fewer interventions considered burdensome, such as tube feeding, were used when those responsible for the patient's treatment were aware of the prognosis and typical course of the disease (Mitchell et al., 2009).

Other Forms of Neurocognitive Disorder

The condition known as neurocognitive disorder is frequently caused by Alzheimer's disease in later life; however, many other conditions can affect the status of the brain and cause the individual to experience loss of memory, language, and motor functions.

People with **vascular neurocognitive disorder** progressively lose cognitive functioning as a result of damage to the arteries supplying the brain. The most common form of vascular neurocognitive disorder is **multi-infarct dementia (MID)**, which is caused by transient ischemic attacks. In this case, a number of minor strokes (infarcts) occur in which a clogged or burst artery interrupts blood flow to the brain. Each infarct is too small to be noticed, but over time, the progressive damage caused by the infarcts leads the individual to lose cognitive abilities.

There are important differences between MID and Alzheimer's disease. The development of MID tends to be more rapid than Alzheimer's disease. Generally, the higher the number of infarcts, the greater the decline in cognitive functioning (Dhamoon et al., 2018).

Vascular neurocognitive disorder seems to be related to risk factors that are similar to those for cardiovascular disease. Diabetes mellitus is associated with a higher risk of vascular dementia, or neurocognitive disorder, particularly in individuals who are older and have a history of stroke and/or hypertension (Sherzai et al., 2016). Metabolic syndrome is also associated with a higher risk of vascular neurocognitive disorder (Ng et al., 2016). Excess fat (adiposity) in the midsection further increases the risk of neurocognitive disorder in late life (Arnoldussen et al., 2018).

Neurocognitive disorder that involves specifically the frontal lobes of the brain is known as **frontotemporal neurocognitive disorder (FTD)**. The individual with FTD experiences personality changes such as apathy, lack of inhibition, obsessiveness, addictive behaviours, and loss of judgement. Eventually the individual becomes neglectful of personal habits and loses the ability to communicate.

People who develop **Parkinson's disease** show a variety of motor disturbances, including tremors (shaking at rest), speech impediments, slowing of movement, muscular rigidity, shuffling gait, and postural instability or the inability to maintain balance.

Neurocognitive disorder can develop during the later stages of the disease, and some people with Alzheimer's disease develop symptoms of Parkinson's disease. Patients typically survive 10 to 15 years after symptoms appear.

There is no cure for Parkinson's disease, but medications are available that can treat its symptoms. The primary drug used is Levodopa (L-dopa); however, over the years this medication loses its effect and may even become toxic. Another, more radical, approach involves applying high-frequency deep brain stimulation of subcortical movement areas of the brain that in the past were excised surgically (Sharma et al., 2016). Research examining the activation of brain cells with flashes of light offers promising treatment for Parkinson's disease. This quickly emerging field of optogenetics presents exciting avenues to better understand the mechanisms involved in Parkinson's disease and to advance and improve treatment (Delbeke et al., 2017).

Lewy bodies are tiny spherical structures consisting of deposits of protein found in dying nerve cells in damaged regions deep within the brains of people with Parkinson's disease. **Neurocognitive disorder with Lewy bodies**, first identified in 1961, is very similar to Alzheimer's disease in that it causes progressive loss of memory, language, calculation, and reasoning, as well as other higher mental functions. Neurocognitive disorder with Lewy bodies can fluctuate in severity, at least early in the disease. The disease also includes episodes of confusion and hallucinations, which are not typically found in Alzheimer's disease. Fortunately, progress in diagnostic methods are making it possible to recognize the symptoms of the disorder, but its cause is still not well understood (McKeith et al., 2017).

A relatively rare cause of neurocognitive disorder is **Pick's disease**, which involves severe atrophy of the frontal and temporal lobes. This disease is distinct from frontotemporal neurocognitive disorder because, in addition to deterioration of these areas, the individual's brain accumulates unusual protein deposits (called Pick bodies). The symptoms of Pick's disease include disorientation and memory loss in the early stages, but the disorder eventually progresses to include pronounced personality changes and loss of social constraints, similar to frontotemporal neurocognitive disorder. Eventually the individual becomes mute, immobile, and incontinent.

Reversible neurocognitive disorders result from the presence of a medical condition that affects but does not destroy brain tissue. If the medical condition is left untreated, permanent damage may be done to the central nervous system, and the opportunity for intervention will be lost. Furthermore, if the condition is misdiagnosed as Alzheimer's disease, the patient will be regarded as untreatable and will not be given the appropriate care at the appropriate time.

A neurological disorder known as **normal-pressure hydrocephalus**, though rare, can cause cognitive impairment, dementia, urinary incontinence, and difficulty in walking. The disorder involves an obstruction in the flow of cerebrospinal fluid, which causes the fluid to accumulate in the brain. Early treatment can divert the fluid away from the brain before significant damage has occurred.

Head injury can cause a **subdural haematoma**, which is a blood clot that creates pressure on brain tissue. Again, surgical intervention can relieve the symptoms and prevent further brain damage. The presence of a brain tumour can also cause cognitive deficits, which can be prevented from developing into a more severe condition through appropriate diagnosis and intervention.

Delirium is an acute cognitive disorder that is characterized by temporary confusion. It can be caused by diseases of the heart and lung, infection, or malnutrition. Unlike neurocognitive disorder, however, delirium has a sudden onset. Because this condition reflects a serious disturbance elsewhere in the body, such as infection, it requires immediate medical attention.

Delirium has many causes, including substance use, intake of medications, head injury, high fever, and vitamin deficiency. Most cases of delirium subside within days, but the condition may persist as long as a month. Although relatively frequent in acute care medical settings, occurring in up to nearly 40 percent of hospitalized older adults (Boustani et al., 2010), the condition is less common within community-residing populations. Within institutionalized settings, the onset of delirium appears to be associated with the presence of pain and use of antipsychotic medications (Cheung et al., 2018). Unfortunately, the individual with delirium may be misdiagnosed with dementia, and an opportunity for intervention will have been lost or at least made more complicated. Furthermore, older adults whose inability to care for themselves renders them as frail (e.g., low on functional independence) may be discharged from the hospital with their delirium untreated or mismanaged (Verloo et al., 2016).

The Canadian Coalition for Seniors' Mental Health (2006) provides detailed guidelines for the assessment and treatment of delirium, targeting interdisciplinary care teams, health care professionals, administrators, and policymakers. In addition, recognizing the need to educate families, provincial health authorities (e.g., Alberta Health Services) have developed resources to assist families in detecting and treating delirium.

Prescribed medications given in too strong a dose or in harmful combinations are included as other potentially toxic substances that can cause neurocognitive disorder– like symptoms. The condition, called **polypharmacy**, in which the individual takes multiple drugs, sometimes without the knowledge of the physician, can be particularly lethal. Recall that the excretion of medications is slower in older adults because of changes in the kidneys, so that older adults are more vulnerable to such toxic effects of medications.

Wernicke's disease is an acute condition caused by chronic alcohol abuse, involving delirium, eye movement disturbances, difficulties maintaining balance and movement, and deterioration of the nerves to the hands and feet. Providing the individual with vitamin B1 (thiamine) can reverse this condition. Unfortunately, if it is not treated, Wernicke's disease progresses to the chronic form of alcohol-induced neurocognitive disorder known as **Korsakoff syndrome**.

Older adults who suffer from clinical depression may show cognitive changes that mimic those involved in Alzheimer's disease. The symptoms of depression in older adults may include confusion, distraction, and irritable outbursts, symptoms that may be mistaken for Alzheimer's disease. Depression may also occur in conjunction with dementia, particularly in older adults who are in the early stages of a dementing disorder. In either case, the depression is treatable, and when appropriate interventions are made, the individual's cognitive functioning can show considerable improvement. We will discuss these issues further in Chapter 11.

The many possible causes of neurocognitive disorder, and the difficulty in distinguishing neurocognitive disorder due to Alzheimer's disease from other forms of cognitive decline, support the notion that the prevalence of Alzheimer's disease may be overestimated, particularly with the rise in obesity in Canada, which presents a significant risk factor for certain forms of neurocognitive disorder.

Clearly, Alzheimer's disease and the variety of neurocognitive disorders described here are major potential limitations on the lives of older adults. Contrary to the impression given by the media, they afflict a minority of older people. Nevertheless, breakthroughs in their treatment, along with contributions to understanding other major diseases, will be among the most significant achievements of science in the 21st century. Universities and research centres across Canada are actively involved in these investigations. For example, the Rotman Research Institute at Baycrest in Toronto is a leader in cognitive neuroscience research and committed to advancing research on all aspects of brain health across the life span, including the prevention and effective diagnosis and treatment of brain disorders.

SOCIAL DETERMINANTS OF HEALTH AND PREVENTION

This chapter would not be complete without some discussion of the social determinants of health and the importance of prevention. Canadians are some of the healthiest people in the world, and they are proud of their universal health care system. Yet, good health and mental health are not enjoyed by all Canadians, and there are numerous inequities across the country. The Government of Canada (2019b) has identified the following 12 main determinants of health: income and social status, employment and working conditions, education and literacy, childhood experiences, physical environments, social supports and coping skills, healthy behaviours, access to health services, biology and genetic endowment, gender, culture, and race/racism. For example, one in five Canadians live in a rural community (Infrastructure Canada, 2019). Compared to urban centres, rural communities have fewer community health services. Provincial health care restructuring often results in reduced services to rural communities and many rural residents are without basic care from physicians and services such as home care and palliative care (Keating et al., 2011). In addition, health care policies and practices that work well in urban environments often do not translate well into rural environments (Robinson et al., 2010).

What is often lost in discussions about health care is the importance of prevention and health promotion. This is particularly true when talking about older adults, where age biases often reflect the notion that there is no point in prevention when you are already old. Chappell (2011) states, "prevention includes valuing older adults within society and ensuring meaningful roles for their participation" (p. 22). We know that preventive practices, even in late old age, can have beneficial effects—for example, in the area of exercise. Not only does physical inactivity increase the risk of many chronic illnesses, it is also expensive, estimated at 67.5 billion in worldwide economic burden per year (Ding et al., 2016). In addition, prevention is a lifelong process. What are you doing today to promote successful aging—eating well, exercising, developing good coping skills and strong social relationships? The benefits that accrue from these practices will be evident far into your future.

Health promotion also involves change at multiple levels. In 2007, the World Health Organization published the global age-friendly cities (now global age-friendly communities) guide to support aging across eight domains: outdoor spaces and buildings; transportation; housing; social participation; respect and social inclusion; civic participation and deployment; communication and information; and community support and health services (World Health Organization, 2007). To date, 10 provinces have embraced this model: British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, New Brunswick, Newfoundland and Labrador, Nova Scotia, and Prince Edward Island. The Age-Friendly Communities Canada Hub (afc-hub.ca) is a site designed to connect all stakeholders who are interested in developing and sustaining age-friendly communities.

SUMMARY

1. Diseases in middle and later adulthood can significantly interfere with quality of life. Risk factors for chronic disease include a sedentary lifestyle, smoking, alcohol use, and unhealthy diets. Cardiovascular diseases, in which there are pathological changes in the arteries in the form of arteriosclerosis and atherosclerosis, are the number one cause of death worldwide. Heart disease also includes coronary artery disease, myocardial infarction, hypertension, and congestive heart failure. Cerebrovascular accidents involve a cutting off of blood to the brain and may be acute or transient. Cardiovascular diseases are the leading cause of death in the over-75 population, with men having a higher risk. Behavioural risk factors include sedentary lifestyle, smoking, high BMI, and excessive alcohol intake. Metabolic syndrome refers to the cluster of symptoms, including abdominal obesity, high blood fats, abnormal levels of blood cholesterol, hypertension and high glucose, associated with high-risk factors for cardiovascular diseases. Preventive medication, diet, and exercise are advised for preventing or reducing the prevalence of heart disease.

2. Cancer is a group of diseases in which there is abnormal cell growth. There are many behavioural risk factors for cancer, including smoking, sun exposure, and lack of control over diet. Environmental toxins can increase cancer risk. Cancer treatment includes surgery, radiation therapy, chemotherapy, and targeted drug therapy.
3. Several musculoskeletal disorders are more common in older adults than in the younger population. Osteoarthritis is a degenerative joint disease in which the cartilage deteriorates. Osteoporosis is an extreme loss of bone mineral content that primarily affects women. Preventive steps include calcium intake, vitamin D, exercise, dietary control, and estrogen-replacement therapy.
4. Type 2 diabetes is an increasingly common chronic disease in older adults, caused by a defect in metabolizing glucose; estimates suggest that a substantial proportion of the over-60 population are afflicted. Prevention and treatment involve weight control, exercise, and medication.
5. Respiratory diseases, including chronic obstructive pulmonary disease, chronic emphysema, and chronic bronchitis, are thought to be caused primarily by cigarette smoking. They have no cure at present.
6. Neurocognitive disorder is a clinical condition involving loss of memory and other cognitive functions. Alzheimer's disease is thought to have genetic causes, but may also reflect lifestyle factors and may co-occur with other forms of neurocognitive disorders. Other neurocognitive disorders include vascular, frontotemporal, Parkinson's, Lewy body, and Pick's disease. There are also reversible neurocognitive disorders, which, if treated, and can lead to a return of normal cognitive functioning.

6

Basic Cognitive Functions: Information Processing, Attention, and Memory

Although declines in memory and attention occur with age, there are ways to slow this process. Take a look at some of the strategies used by older adults to help improve their cognitive functioning. Chances are, you already use some of these strategies!

AGEFEED

#braingames

1. **Train your brain.** Look for new challenges every day, from crossword puzzles to videogames to taking different routes to get to the same place.
2. **Limit distractions.** Easier said than done in this age of multitasking, but focusing on one task at a time boosts your memory (hint: stay off social media during class!).
3. **Keep organized.** Make lists, reduce clutter, and keep common items in the same location.
4. **Practice mindfulness.** Focus on your current inner state while you remain aware of your surroundings.
5. **Stay healthy.** Good physical health promotes mental agility.
6. **Use mnemonics.** Memory tricks can help you remember everything from gardening advice (''leaflets of three, let it be'' to avoid poison ivy) to people's names (''Joy has a baby boy'').
7. **Stay hydrated.** Drinking plenty of water can help you avoid sluggishness and memory loss.
8. **Use visualization.** Ever go into another room to get something and forget what it was? Imagine that you're picking the item up as soon as you decide to go get it.
9. **Write things down.** Like, with a pen or pencil. Handwriting outweighs typing on a computer or phone, in part because your brain is better activated when creating each letter's shape rather than hitting keys that all have the same shape and feel.
10. **Make new brainpaths.** Use your fingertips to trace the outlines of objects. Each repetition will help you build new synapses.

Cognition refers to the way the mind works, specifically, the processes of attention, memory, intelligence, problem-solving, and the use of language. We know that aging affects each of these areas of functioning, leading to important changes in many people's abilities to carry out their everyday activities.

PROCESSING SPEED AND ATTENTION

One of the most widely studied areas in cognition and aging, **processing speed** is the amount of time it takes for an individual to analyze incoming information from the senses, formulate decisions, and then prepare a response on the basis of that analysis. One of the fundamental units of study in cognitive and aging, researchers have used processing speed as an indicator of the integrity of the central nervous system.

Reaction Time

The basic measure of processing speed is **reaction time**. To measure reaction time, researchers ask their participants to complete an action such as pushing a computer key when the screen flashes a particular stimulus, known as a target. Stimuli that do not fit the criteria for the target are called distractors.

In **simple reaction time tasks**, participants are instructed to make a response such as pushing the key as soon as they see the target, such as a red circle appearing on the screen in front of them. In **choice reaction time tasks**, participants must make one response for one stimulus and another response for a different stimulus. For example, they would push the "F" button for a red circle and the "J" button for a blue circle.

In some studies, participants see a cue prior to the target's presentation. This cue directs them to look in a particular area of the computer screen. The cue may or may not direct them to the exact spot on the screen where the actual target will appear. In some studies, researchers use misleading or irrelevant cues to determine how distracting information alters the individual's responses and compare performance in response to these cues to performance in response to relevant cues.

Researchers know with certainty that the reaction time as a young adult will be lower (i.e., the person will be quicker) than when that individual gets older. The question is, by how much and under what circumstances will it increase? The documented changes in reaction time with age in adulthood are typically a matter of several hundreds of milliseconds, not enough to be particularly noticeable in everyday life, but enough to be significant under the scrutiny of the laboratory researcher.

People vary greatly in the rate at which they experience a slowing in reaction time and seem to do so more among older groups than younger groups of adults. Increasing variability in reaction times with age reflect, in part, variations in health and fitness (Deary & Ritchie, 2016).

Why do reaction times slow as people age? According to the **general slowing hypothesis**, the increase in reaction time reflects a general decline of information processing speed within the nervous system of the aging individual (Salthouse, 1996). The **age–complexity hypothesis** proposes, furthermore, that through slowing of central processes in the nervous system, older adults perform progressively more poorly as the tasks become more complex and their processing resources are stretched more and more to their limit (Cerella et al., 1980).

FIGURE 6.1

Relationship Between Reaction Times of Younger and Older Adults

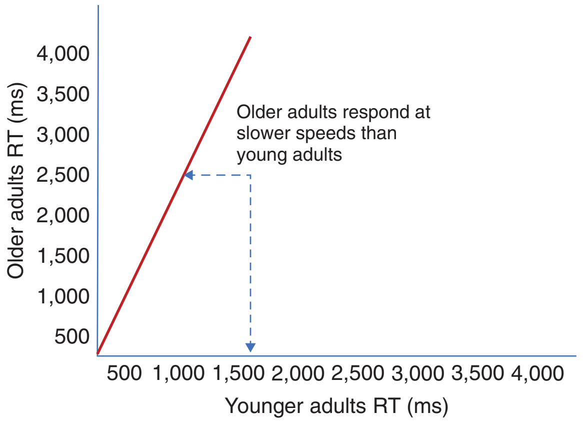


Diagram showing the Brinley plot in which performance of older adults is plotted against performance by younger adults, revealing that as the task becomes more difficult (requires more time), older adults are disproportionately slower.

The age–complexity hypothesis is reflected in the **Brinley plot**, in which reaction times of older groups of adults are plotted against the times of younger adults (see Figure 6.1). If you look closely at this graph, you can see that in the 500 ms range (half a second), older and younger adults have similar performance. These are the tasks that are relatively easy; this is why they are performed so quickly. However, on tasks that take longer for young adults to complete (1,000 ms or 1 s), older adults take proportionately longer (1,500 to 2,000 ms) than they do on the 500 ms tasks. The hardest tasks take young adults about 2,500 ms to complete, but take older adults as long as 4,000 ms to complete.

The general slowing hypothesis is consistent with a large body of data on reaction time performance in adulthood. This hypothesis does not identify any particular stage or component of information processing as the culprit for causing age differences in reaction time, though there is the assumption that the slowing reflects lack of efficiency in the central rather than peripheral nervous system. As we will see later, the general slowing hypothesis is also used to explain age differences in memory. A loss of speed leads to memory impairments, as a backlog develops in cognitive processes calling for multiple operations to be completed simultaneously or within a limited time.

Attention

Attention involves the ability to focus or concentrate on a portion of experience while ignoring other features of that experience, to be able to shift that focus as demanded by the situation, and to be able to coordinate information from multiple sources. Once your attention is focused on a piece of information, you are then able to perform further problem-solving.

If you have difficulty concentrating or focusing your attention for long periods of time, you are certainly aware of how frustrating it can be to miss important information or details when you divert your mental resources away from the task. Persistent and serious attentional problems characterize people with attention deficit disorder who, as a result, may have difficulty learning new information or performing more than one task at a time. The attentional deficits associated with the normal aging process can lead to difficulties of a similar nature, particularly when individuals have to make complex decisions within a short period of time.

Types of Attentional Tasks. Studies of attention are important for understanding the cognitive functions of adults of varying ages and their abilities to function in various real-life situations in which cognitive resources must be focused on some target or goal. Researchers approach these issues by breaking down the attentional tasks involved in everyday life into components to examine in the laboratory. For the most part, these studies suggest that people become less efficient in the use of attentional processes as they get older.

Two methods used in studies on attention and aging involve **visual search tasks** which require that the observer locate a specific target among a set of distractors. In **simple visual search**, the target differs from the other stimuli by only one feature, such as shape, colour, or size. Your task would be to respond by pushing a computer key every time you saw a specific target appear on the screen in front of you. The target might be an "X" appearing among a set of distractors, such as "+" signs of the same size and colour.

Participants completing tests of simple visual search can generally reach high levels of performance very quickly across the trials of an experiment. When this occurs, the target is said to "pop out" among the distractors. At that point, the search is automatic. Because the target is so easy to detect, reaction time tends not to increase as the number of items in the stimulus array gets larger. There could be 10 or 50 black "Xs" in the array, but, as long as participants can see all the stimuli, participants will find it easy to see if that "+" is there or not.

In **conjunction visual** search, the target differs from the distractors in more than one way. If the target is a red X, the distractors could be blue +s, red +s, and blue Xs. To register a correct response, the respondent must indicate that the target is present only when the field contains the red X.

Researchers propose that simple visual search relies on parallel processing, meaning that you can scan the whole array at once, just looking for the one feature that matches that of the target. It's as if you were at a home basketball game and wanted to spot your friend, a fan of the visiting team, in the large crowd. If all the home fans are wearing the school colours (e.g., maroon), your friend's light blue shirt will easily jump out at you. Older and younger adults perform at similarly high levels in simple visual search tasks, finding the targets quickly and accurately (Whiting et al., 2005).

Conjunction search relies on the more time-consuming task of serial processing because each stimulus must be examined in sequence to determine whether it has all the qualities of the target. You first have to detect colour (or shape) and then detect the second attribute. The larger the number of stimuli to scan, the longer the participant will take to decide whether the target is present or not. In the case of your friend at the basketball game, should the visiting team's shirts also be maroon, it would take you much longer to find your friend's face among the fans, especially in a large arena.

Comparisons of older and younger adults on conjunction search show that both age groups perform less efficiently than they do on simple search tasks. However, the cost to performance is higher for older adults, in part because they require more eye movements while processing the stimuli (Porter et al., 2010).

On the other hand, older adults have greater experience in making decisions in real-life settings, which can benefit them when they scan actual environments. When compared with younger adults on a search task that included context to guide their attention, older adults were more likely than younger adults to benefit from background cues (Neider & Kramer, 2011). Furthermore, older adults can benefit from training that gives them practice and guidance in performing even very difficult conjunction searches (Neider et al., 2010).

One particularly important area of attentional performance that you undoubtedly know about is called "multitasking," in which people have to attend to more than one input source at a time. While multitasking, most people pay a price in terms of the quality of their performance. This includes lower academic performance by college students who go on social media or who text while in class (Junco, 2012). It is not only college students, though, who perform more poorly when multitasking. The disadvantages of multitasking that people experience increase progressively in older age groups (Kramer & Madden, 2008).

A number of investigators who study attention and aging are interested in the way that older adults mentally juggle the information they must manage when it comes in from different sources. In particular, researchers try to determine whether older adults have difficulty turning off one response while performing another in what is called **inhibitory control**. One of the best known inhibitory attention tasks is the Stroop test, in which you are told to name the colour of ink in which a word is printed. In the critical trials on the Stroop test, your response time and accuracy are compared when the colour and the word match (e.g., the word "red" printed in red) with your performance when the colour and the word do not match (e.g., "red" is printed in green). People with good inhibitory control can quickly state the colour name without being distracted by the colour of the printed letters.

In a **sustained attention** task, participants must respond when they see a particular target appear out of a continuous stream of stimuli. This is the type of attention that many video games require when players monitor a constantly changing visual array. Laboratory tasks of sustained attention are similar in principle, though not as elaborate. For example, in a typical experimental task, participants watch a computer screen with a series of stimuli; they're told to respond only when the target stimulus appears (such as the letter "X" moving onto a screen containing all "Y"s). In some conditions, the experimenter provides cues that give participants notice about whether and where to look for the target just before it appears. Older adults typically have more difficulty on sustained attention tasks than do younger adults in part because they take longer to shift their focus from trial to trial (Golob & Mock, 2019).

There are key ways in which attention may be preserved in older adults. For example, although older adults are typically slower when processing information from visual displays, they can remember the location of an item presented in a visual display and may be even more efficient at this task than are younger adults (Kramer et al., 2006). Additionally, healthy older adults, with practice, can activate different areas of the brain than can younger adults to improve their performance on the Stroop task to comparable levels (Schulte et al., 2009). Such results support models proposing that aging involves a degree of neural plasticity, a topic we will return to shortly.

Theories of Attention and Aging. Researchers appear to divide into two camps in accounting for age differences in attention (Figure 6.2). The **attentional resources theory** regards attention as a process reflecting the allocation of cognitive resources. When you focus on a particular object, you must dedicate a certain proportion of your mental operations to that object. According to this theory, older adults have greater difficulty on attentional tasks because they have less energy available for cognitive operations than do their younger counterparts (Kilb & Naveh-Benjamin, 2015).

The second theory of attention and aging, the **inhibitory deficit hypothesis**, suggests that aging reduces the individual's ability to inhibit or tune out irrelevant information (Butler & Zacks, 2006). As we discussed earlier, one important feature of attention is the ability to focus on one element of a stimulus array while ignoring others. If older adults cannot ignore irrelevant information, their attentional performance will suffer.

The inhibitory deficit hypothesis implies that middle-aged and older adults perform best when they have few distractions. One source of such distraction may be their own concern over how they are performing, which therefore may cause them to perform even more poorly than they otherwise would. Imagine that you are a computer programmer anxious about the possibility of being laid off or reassigned because you are not as quick as you once were in your job of inspecting arrays of new data. The more you worry about how you are performing, the less able you are to concentrate on your task. Your performance deficits might ultimately lead you to lose your job or be reassigned to other duties. Thus, people who are worried about the aging of their cognitive abilities may be more likely to engage in identity accommodation, the "over-the-hill" mentality, a process that will ultimately contribute to poorer performance.

The inhibitory deficit hypothesis initially received widespread support from studies in which electrical activity of the brain was used to indicate the ability to block out distracting stimuli on visual tasks (West & Schwarb, 2006). However, more recent evidence suggests that older adults are not entirely disadvantaged in inhibitory attentional tasks. As we noted earlier, they can benefit from practice with the Stroop test in ways similar to younger adults (Davidson et al., 2003), suggesting that performance on certain types of attention can be improved regardless of age. Additionally, older adults may even perform better than young adults on inhibitory tasks by activating their frontal lobes in a compensatory manner (Staub et al., 2014). Furthermore, if stimuli are presented in two modalities, such as auditory and visual, older adults are capable of showing levels of inhibition comparable to those of young adults (Guerreiro et al., 2015).

Drawing upon the idea that older adults can overcompensate for attentional deficits, they can also take advantage of their greater experience when confronted with situations that tap into that experience and can compensate for age-related changes in sustained attention. In a simulated air-traffic control experiment, older adults who showed deficits on laboratory attentional tasks were able to perform well on the complex tasks required in the situations they encountered on the job on a daily basis (Nunes & Kramer, 2009). Education and verbal experience may also protect against increases in distraction while reading (McGinnis, 2012). Thus, although aging may affect attentional performance, the roles of experience and training may mitigate some of these effects to preserve important areas of functioning.

Coming to the problem from an entirely different perspective, Ramscar et al. (2014) argue that the deficits shown by

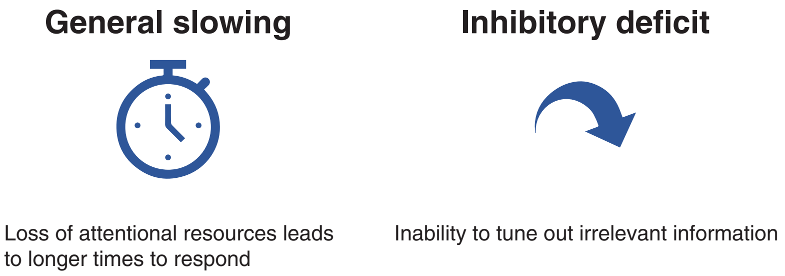

General slowing
Inhibitory deficit
Loss of attentional resources leads to longer times to respond
Inability to tune out irrelevant information

FIGURE 6.2

Theories of Aging and Attention

The two primary approaches to aging and attention/speed contrast the general slowing hypothesis with the inhibitory deficit model.

older adults in cognitive tasks can be explained by their lifetime's accumulation of knowledge. Because they have more experience, older adults also have more information to sort through when they must make a decision. In a laboratory task, where every millisecond counts, they may therefore appear "slower." In everyday life, though, such delayed responding would be unlikely to have a measurable impact.

Video Games and Attention

With the increasing popularity of video games, many of which demand quick decisions and response speed, researchers have taken to the laboratory to investigate whether older adults can be trained in playing these games to improve their attentional control in real-life situations. In action video games, such as first-person shooter games (*Call of Duty, Halo,* and *Battlefield*) or third-person shooter games (*Grand Theft Auto, Gears of War*), the player must have excellent hand–eye coordination, play at a fast pace, and track multiple inputs. The aggressive content of these games aside, their cognitive benefits are becoming well established.

Young adults who play action video games have improved attentional capacity (Green & Bavelier, 2003). Experienced players have more efficient eye movements (West et al., 2013), and scan a display more quickly, automatically appraising such features as the number of items in a display without having to count (Riesenhuber, 2004).

Players of these games also have more attentional resources that they can devote to rapidly changing inputs, meaning that they will make finer-grained distinctions and, therefore, better decisions. They are also better able to focus their attention and ignore distracting or irrelevant information. However, it is important to keep in mind that there may be a self-selection bias operating so that people with better attentional resources also gravitate towards playing these games (Boot et al., 2008).

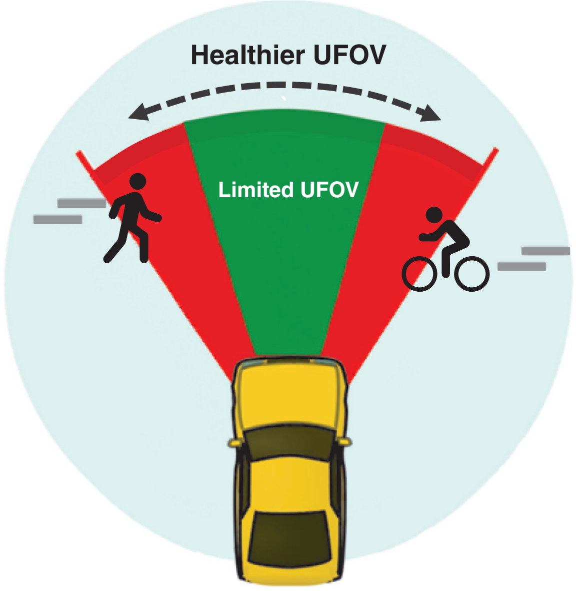
Experimental studies using action video games as a training tool show that they can enhance a variety of skills, including peripheral attention (seeing a target at the outer edges of a display), ability to process a rapidly changing stream of information, and keeping track of multiple targets (Bavelier et al., 2012). Video game training may also improve probabilistic learning, in which the individual becomes more adept at predicting the outcomes of particular actions (Schenk et al., 2017). Training also seems to improve the driving-relevant task called **Useful Field of View (UFOV)**, which tests people's ability to respond to stimuli appearing in the periphery of their vision (see Figure 6.3) (Green & Bavelier, 2006).

If video games can have these beneficial effects on young adults, it would make sense that they could also improve the attentional abilities of older adults (Dye et al., 2009). Studies going back to the early 1990s show that, among older adults, training in video games can improve speeded performance (Dustman et al., 1992; Goldstein et al., 1997).

With the continued development of personal computer–based video games, researchers are able to investigate the effects on attention and speeded performance in a wider variety of formats. Older adults do not prefer to play first-person shooter games (McKay & Maki, 2010) but are instead drawn to casual video games played on a personal computer (Whitbourne et al., 2013). These ordinary computer games, as well as those specifically intended to improve cognition in older adults ("brain training"), appear to have beneficial effects on focused and sustained attention (Peretz et al., 2011).

FIGURE 6.3

Example of a Useful Field of View (UFOV) Task



The Useful Field of View is the amount of visual information a person can take in with a glance without eye or head movements.

On a cautionary note, however, consumers should be aware of the possibility that companies which sell brain training games provide misleading promotional materials about the benefits of their products. In 2016, the U.S. Federal Trade Commission charged that Lumosity, the producer of one of these games, was doing just that, and the company was given a warning to desist along with a $2 million fine. A randomized control trial study concluded that these games can have some positive effects on everyday functioning but inconsistent effects on cognition (Motter et al., 2016).

DRIVING AND AGING

The ability to drive is undoubtedly one of the most important functional areas of an adult's life, particularly for people who live in areas that are not well served by public transportation. Changes in basic cognitive functions threaten to impair the older adult's ability to perform this vital task. Furthermore, as we saw in Chapter 4, there are also a number of changes in the visual system that can impair the performance of older drivers, including loss of visual acuity, increased sensitivity to glare, and difficulty seeing in the dark. Physical changes may also limit the older driver's ability to get in and out of a car, fasten a seat belt, change the seat position, turn the steering wheel, or cope with a breakdown (Arbesman & Pellerito, 2008). Finally, many medications used to treat chronic conditions in older adults

TABLE 6.1

Percentage of Driver and Passenger Fatalities and Serious Injuries by Age Group, 2018

	Fatalities		*Serious Injuries*	
Age Group (yrs)	*Drivers*	*Passengers*	*Drivers*	*Passengers*
0–4	0.0	3.5	0.1	4.3
5–14	0.0	6.7	0.1	7.8
15–19	5.3	11.1	6.9	14.0
20–24	11.2	13.5	10.9	13.6
25–34	17.8	17.8	20.5	16.8
35–44	14.8	8.5	16.9	9.3
45–54	14.8	9.1	16.4	9.2
55–64	15.5	10.5	13.9	9.4
65+	20.6	17.8	14.2	12.5
Not stated	0.0	1.5	0.1	3.1
Total	**100.0**	**100.0**	**100.0**	**100.0**

Source: Government of Canada. (2019a). *Canadian Motor Vehicle Traffic Collision Statistics: 2018*. Transport Canada: Ottawa, ON: Author. Retrieved from https://www.tc.gc.ca/eng/motorvehiclesafety/canadian-motor-vehicle-traffic-collision-statistics-2018.html

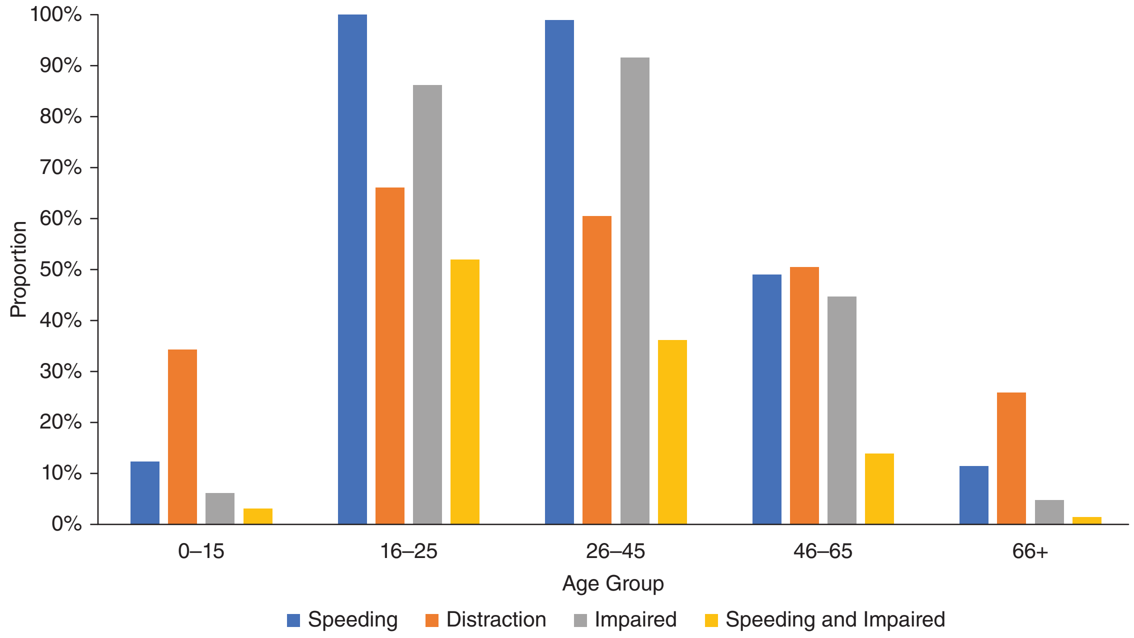
can impair their driving ability because of side effects such as drowsiness, confusion, and dizziness (Sargent-Cox et al., 2011). Driving with pets, especially in the front seat, is another potential source of motor vehicle accidents for older adult drivers (Huisingh et al., 2016).

Despite the media reports that follow each fatal accident involving an older driver, age alone does not determine whether an older adult is safe behind the wheel. Health problems, the use of medications, sensory deficits, and cognitive factors also play a role. As shown in Table 6.1, in 2018 the highest percentage of traffic fatalities occurred among adults aged 65 and older (20.6 percent), with the second-highest number among those aged 25 to 34 (17.8 percent). The percentage of serious injuries was highest among those aged 25 to 34 at 20.5 percent (Government of Canada, 2019a). However, it is also important to consider the crash rate per miles driven. Data from the Insurance Institute of Highway Safety (IIHS) indicate that drivers who are age 70 and older have higher crash rates per mile driven than middle-aged drivers, but that these rates are substantially lower than for young drivers (IIHS, 2020).

Also, as data from British Columbia clearly indicate, the contributing factors for motor vehicle fatalities vary across age groups (see Figure 6.4). Speeding and impaired driving were most common among those aged 16 to 45, while distraction was most common among those aged 66 and older. The Canadian Motor Association (2019) highlights the specific dangers associated with cannabis use while driving, indicating from survey data that 26 percent of those aged 18 to 34 have either driven high or travelled in a car with a driver who was high. Moreover, the majority of young adults (86 percent) in the survey recognized the need to find alternative ways of transportation after alcohol use, but 70 percent indicated it was

FIGURE 6.4

Proportion of Fatalities by Age Group and Contributing Factors, British Columbia, 2015–2017



Data Source: Business Information Warehouse – Traffic Accident System, Insurance Corporation of British Columbia.

Speeding is the most common contributing factor for fatalities among individuals 16 to 45 while distraction was the most common contributing factor for those 66 years and older.

Source: B.C. Injury Research and Prevention Unit. (2020). *Motor vehicle*. Vancouver, BC: Author. Retrieved from https://www.injuryresearch.bc.ca/quick-facts/motor-vehicle significantly less important after using cannabis. Obviously, there is a need for additional public education in this area. In addition, distracted driving is a concern among younger drivers. In fact, for younger drivers, distracted driving due to cell phone use and manipulation of complex dashboard information panels pose just as significant a risk as vision changes in older adults (Klauer et al., 2015).

Although previous research identified left-hand turns (in countries with right-side driving) and lane merging as particular risks for older adults, a more careful analysis of physiological responses during difficult manoeuvres, as well as performance, yielded no evidence of differences from younger drivers (Koppel et al., 2015). Counteracting the effects of age on rapid, complex, decision-making is the fact that older adults avoid many of the causes of motor vehicle accidents that injure, or take the lives of, younger adults. Many older drivers are able to self-regulate their behaviours to compensate for the changes they experience in their visual and cognitive abilities. They avoid driving at night, on interstate highways, and during rush hour (Desapriya et al., 2014). They also self-limit their driving if they become aware of limitations in their cognitive functioning (Pyun et al., 2018) in which they must make risky left-hand turns (Okonkwo et al., 2008). Older adults, perhaps rightly so, are concerned about unsafe drivers on the road, a concern that translates into their increased use of seat belts (Allen et al., 2019).

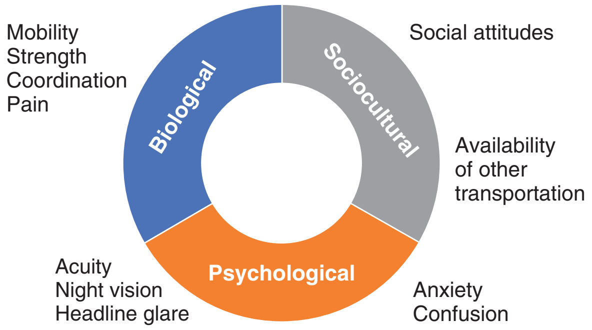
Another factor to consider is that older drivers have decades of experience behind the wheel that can compensate for their slower reaction times, particularly if they don't need to make a response within a fraction of a second. Under icy conditions, for example, experienced older drivers know how to control the car to avoid a spinout. They may also be better able to predict what other drivers will do in certain situations, such as whether someone will pull out of a parking spot without signalling.

Driving provides a perfect example of the importance of adopting a biopsychosocial perspective to understand the aging process (see Figure 6.5). Biology (changes in vision and reaction time) and psychology (internal distractions causing anxiety) each play important roles. The sociocultural component of the equation provides further insight into this comprehensive model. Driving is necessary in order to live independently in many regions of Canada and in other countries that lack comprehensive public transportation. Older adults who live in suburban or rural areas with limited or no public transportation lose an important connection to the outside world and risk becoming housebound and socially isolated, particularly if they restrict their own driving due to loss of confidence in their abilities (Wong et al., 2016).

In terms of identity, older adults may also incorporate social attitudes about aging and driving that serve to impair their performance beyond what would occur due to the normal aging process. Older adults who doubt themselves more frequently will hesitate before making a response due to worries about their abilities or may suffer internal distractions because they are so preoccupied with their own concerns. Prejudice against them by younger people can exacerbate whatever fears and concerns older drivers already have about their changing abilities. They may hear derogatory phrases such as "driving while old" or "gray head" and become even more concerned and hence distracted.

FIGURE 6.5

Biopsychosocial Model of Driving



Driving and aging can be thought of in terms of the biopsychosocial model.

As the number of older drivers continues to grow—due to the increased longevity of the baby boomer generation—appropriate safeguards are being considered for them by public officials, such as driving tests and safety classes. Highway safety experts are also exploring alternatives to the traditional intersection, such as substituting well-designed roundabouts for the type of complex junction that can cause so many accidents while turning. Older drivers can also benefit from easy fixes to their automobiles, such as adjusting the head restraints, steering wheel tilt, and mirror. In one survey of aging drivers, researchers found that over half needed to have their head restraints readjusted to provide proper support. Furthermore, through new technologies, such as collision avoidance systems, automobiles will eventually become better adapted to the needs of older drivers (Arbesman & Pellerito, 2008).

Nevertheless, there is value to maintaining precautions that protect all drivers from accidents caused by distracted driving, visual losses, or slowing of response speed. Current licensing policies and procedures are not well equipped to handle the influx of older drivers. Recommendations to address this growing public safety concern include identifying older drivers who may be medically at-risk and impaired rather than restricting all older drivers (Dobbs, 2008).

It's also worthwhile to consider that speed is not everything when it comes to navigating your way around the highways and byways of your community. Allowing more time for older drivers to get where they are going might not be such a bad idea and could even make the roads safer for everyone. It is also important to remember that prevention efforts should focus on the avoidable fatalities involving younger drivers who are under the influence of alcohol or other substances. The real "number one killer"—in Canada, at least—is not heart disease but fatal accidents involving drivers who are under the influence: people die at much younger ages than biology would dictate.

Canada (Candrive II) and Australia (Ozcandrive) are currently collaborating on a prospective study of 1,300 older drivers in Canada, Australia, and New Zealand, including over 900 participants from seven cities across four provinces in Canada (Marshall et al., 2013). One of the goals of the study is to develop a measure that assesses how older drivers self-report collisions, the Driver Behaviour Questionnaire (DBQ). Longitudinal data indicate that the DBQ is a reliable and stable measure

Jaroslaw Igras/Pixabay

Although the many roundabouts in this intersection appear potentially confusing, the British government is now investing in redesigns of roadways to ease traffic patterns.

that is appropriate for examining self-reported aberrant driving behaviours in older adults (Koppel et al., 2018, 2019). This is important because there are discrepancies between self-reported collisions and official jurisdictional records, and it is important to have an accurate understanding of accident rates.

Other research from this study has examined attitudes towards driving in relation to the self-regulation of driving. Jouk et al. (2016) demonstrated that older adults whose attitudes towards driving became more negative were more likely to restrict their driving, particularly in challenging driving situations and were more likely to perceive a decline in their driving abilities. Tuokko et al. (2016) examined the relationship between perceived health and the self-regulation of driving. Results indicate that this relationship is influenced by attitudes towards driving such that older adults in poorer health have more negative attitudes towards driving and this, in turn, makes them more likely to self-regulate their driving.

In Canada as in other countries, there has been a significant effort to assist older drivers, their family members, and health care professionals involved in the assessment of older drivers. Examples of these initiatives include the Medically At-Risk Drivers' Centre at the University of Alberta, the Saint Elizabeth Driver Assessment and Training Service in Ontario, and the Canadian Motor Association and its provincial chapters. A key goal is to develop assessment measures that can be used by primary care physicians to identify at-risk drivers, such as Screen for the Identification of Cognitively Impaired Medically At-Risk Drivers (SIMARD) MD (Dobbs & Schopflocher, 2010). This is an evidence-based decision-making tool for identifying older drivers at risk for at-fault crashes. Early research suggests that this tool lacks sufficient precision to be used to identify at-risk older drivers, and, if used alone, may place them at risk of losing their transportation (Bédard et al., 2013). Moreover, it may be unfairly biased against those with less education. Further research is needed to establish the utility of SIMARD MD. The Candrive II/Ozcandrive data set was also used to examine the Assessment of Driving Related Skills (ADReS), a tool recommended for assessing medical fitness to drive by the American Medical Association and the National Highway Traffic Safety Association. Results indicated that a crash in the previous two years was unrelated to scores on the ADReS (Woolnough et al., 2013). These findings illustrate how difficult it is to develop tests that can adequately detect at-risk older drivers. As a result, behavioural measures that involve on-road evaluations have begun to emerge. The Driving Observation Schedule (DOS) was evaluated among 33 drivers aged 75 and older and shows promise as a method of assessing the abilities of older drivers in their everyday environments (Vlahodimitrakou et al., 2013).

MEMORY

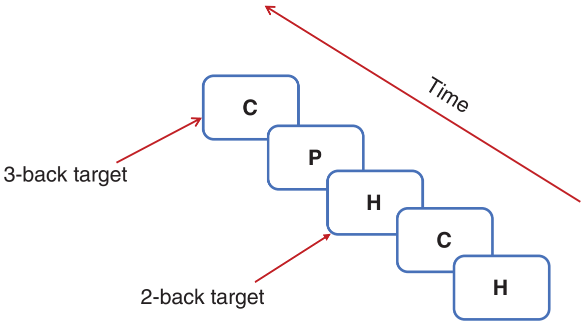
One of the changes people fear the most about aging is that they will lose their memory. It is perhaps for this reason that nutritional supplements supposedly targeting memory and those "brain games" have become so commercially popular. The data on the effects of aging on memory suggest that the aging process indeed has negative effects on many aspects of memory. However, as was true for attention, not all aspects of memory are affected in the same way by aging, nor is everyone affected the same way by aging, so that the process of memory loss is by no means completely inevitable.

Working Memory

After you attend to information, the next step is to register that information into consciousness. This process is known as **working memory**, which keeps information temporarily available and active in consciousness. You use your working memory when you are trying to learn new information or bring to mind information you learned previously that you are trying to recall. Working memory and attention are closely linked, as controlled attention is required to juggle multiple thought processes.

FIGURE 6.6

Example of a Working Memory Task



Schematic of n-back working memory task. Participants see the letters in the order shown on the screen, from “H” to “C.”

Researchers assess working memory by assigning a task to participants that prevents them from consciously rehearsing the information they are supposed to remember. The “n-back” task, a commonly used working memory test, requires you to repeat the “nth” item back in a list of items presented to you in serial order. For example, you might see a series of visual stimuli, such as a yellow triangle, a red square, a green circle, and a blue diamond. In each instance, you are asked whether the stimulus is new or one previously seen. In the “1-back” task, you are shown the yellow triangle followed by the red square followed by the yellow triangle and asked to remember the stimulus shown prior to the red square (the yellow triangle). The further back in the series (e.g., in the “3-back”), the harder the task because more demands are placed on working memory.

You can see an example of an n-back working memory task in Figure 6.6. The letters would be presented starting with H and then move through the series. The H would be a 2-back task and the C would be a 3-back task. One advantage of this task is that it can be easily applied to neuroimaging studies because the stimuli can be presented on a screen that the subject views in a brain scanner such as an fMRI.

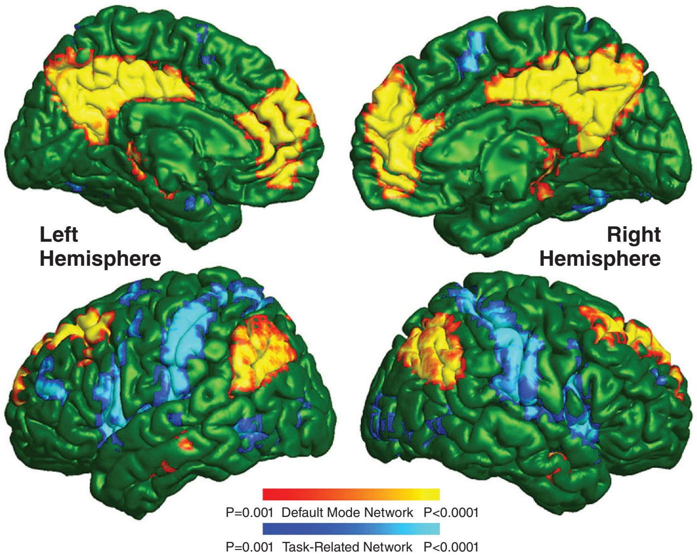
Through neuroimaging studies that connect how individuals perform on memory tasks to patterns of their brain’s activity, researchers are beginning to understand the structural basis for the effects of aging on working memory. These studies look not just at what individual brain regions do during cognitive tasks but also at how these brain regions communicate with each other through networks. These studies are also able to test neuroplasticity models we discussed in Chapter 4 by documenting which regions of the brain are more activated in older adults than younger adults during a working memory task. Although this field is still relatively young, there are signs of promise that the proposed models of neuroplasticity can be traced to patterns of brain activation during working memory tasks (Froudist-Walsh et al., 2018).

Also relevant to working memory performance is the **default network,** a circuit in the brain that is active when the brain is at rest while processing internal stimuli (see Figure 6.7). The default network includes the hippocampus, parts of the prefrontal cortex, the parietal lobe, the temporal lobe, and part of the cingulate cortex involved in visualization. During tasks such as those involved in working memory, other areas become activated and the default network becomes deactivated. The default network may itself be subdivided into those regions involved in thinking about your own experiences and those that process your knowledge about events and facts that did not happen to you (Kim, 2012). In both cases, the network needs to turn itself off when you’re trying to remember new information.

Age-related changes in the ability to deactivate the default network may contribute in part to poorer working memory performance in older adults (Hafkemeijer et al., 2012). Instead

FIGURE 6.7

Default Network


Left Hemisphere
Right Hemisphere
P=0.001 Default Mode Network P<0.0001
P=0.001 Task-Related Network P<0.0001

Default mode and task-related maps for healthy participants. On a green background, the default mode network is highlighted in warm colours (red and yellow) and the task-related network is highlighted in cold colours (blue and green).

of focusing on the information they need to be remembering, they use their cognitive resources on inwardly oriented stimuli.

On the other hand, by drawing on their inner resources, older adults may be able to use previous knowledge of stored information, which would represent an adaptive shift in the allocation of cognitive resources (Spreng et al., 2014).

Effects of Aging on Long-Term Memory in Adulthood

We turn next to **long-term memory**, the repository of information that is held for a period of time ranging from several minutes to a lifetime. Long-term memory contains information that includes the recent past, such as remembering where you put your cell phone half an hour ago, to information from many years ago, such as what happened at your fourth birthday party. The processes of long-term memory include encoding, storage, and retrieval. You encode information when you first learn it, keep it in long-term storage, and retrieve it when you need to use it on a subsequent occasion.

Episodic memory is long-term memory for events ("episodes"). Research suggests that older adults experience impairments in episodic memory, both in encoding and retrieving information (Shing et al., 2010). Episodic memory also depends on the integrity of connections among the frontal cortex, temporal and parietal lobes, and areas of the subcortex, including the thalamus. Age-related damage to the white matter, which shows up as white matter hyperintensities, may be associated with memory changes in these regions (Lockhart et al., 2012).

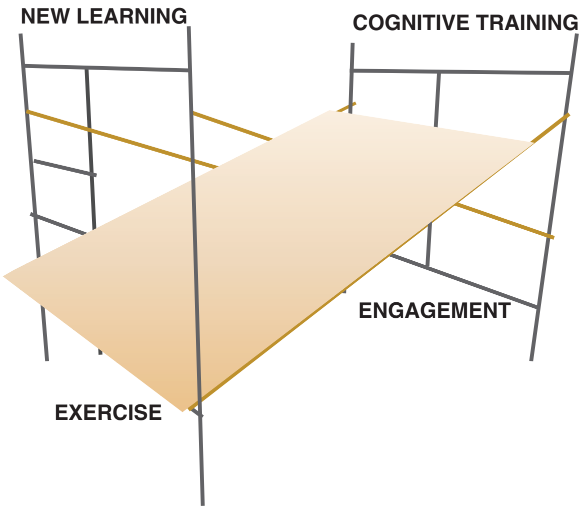
However, in normal aging, these structural changes in areas of the brain involved in working memory may be compensated by heightened activation of the prefrontal cortex. According to **scaffolding theory**, older adults are able to recruit alternate neural circuits as needed by task demands to make up for losses suffered elsewhere in the brain (see Figure 6.8). Thus, working memory may decline in later adulthood, but individuals can circumvent these declines by bringing compensatory mechanisms into play. Additionally, life course factors may come into play, such as education, stress, exposure to toxins, health and physical activity, and personality changes over time (Reuter-Lorenz & Park, 2014).

Remote memory involves recall of information from the distant past. In general, information stored and not accessed from remote memory becomes increasingly difficult to retrieve with passing years. A popular myth is that older people can remember information from many years in the past better than they can remember more recent information. However, this is not supported by data on remote memory (Aizpurua & Koutstaal, 2015). In one study, Boston Red Sox fans were asked to recall details of the 2003 and 2004 league championship games between the Red Sox and the New York Yankees. Nearly 10 years later, older participants consistently showed poorer recall than younger participants (Breslin & Safer, 2013).

The exception to this research on remote memory occurs in the area of **autobiographical memory**, or the recall of information from your own past. Many people seem to experience a **reminiscence bump** of very clear memories for the ages of from about 10 to 30 years (Rubin et al., 1998), an effect that is particularly strong for happy memories (Gluck & Bluck, 2007). Researchers believe that these memories are preserved in part because they are central to identity (McLean, 2008). Remote memories that are not as personally relevant fade with the passage of time.

FIGURE 6.8

Scaffolding Theory



According to the scaffolding theory, older adults can recruit alternate neural circuits as needed by task demands as shown by these potential routes.

Flashbulb memory is the recall of important and distinctive events that stand out from other memories of past events. For example, you may remember where you were and what you were doing on July 6, 2013, when you heard the news that 47 people died in the small Quebec town of Lac-Mégantic, when a runaway train jumped the tracks near the centre of town, slammed to a stop, and erupted in flames. When older adults form such memories, the emotional meaning that makes them distinct can prove to enhance their ability to recall the event. For example, in the case of the 2000 U.S. Presidential election, even older individuals with slight cognitive impairments were able to remember factual details of the event (Waring et al., 2014).

In contrast to episodic memory, there are no declines in normal older adults in **semantic memory**, or the ability to recall word meanings and factual information. Additionally, older adults seem to have well-preserved abilities to remember the names of famous people from viewing their faces, although their associations to those name–face combinations may differ from those formed by younger adults (Pistono et al., 2019).

Long-term memory also includes your ability to remember actions. **Procedural memory** is recall of the actions involved in particular tasks, such as sewing on a button, playing the piano, and riding a bike. Like semantic memory, procedural memory holds up well with age. In one particularly impressive study, a sample of approximately 500 adults ranging from ages 18 to

95 years were tested on their ability to learn a fine motor task in which they had to use their fingers to slide a small metal nut off a rod as quickly as possible. Not only did older adults show significant improvement in performance over a series of five learning trials, but they retained their memory for the task for as long as two years later with no drop-off in performance (Smith et al., 2005). Adults performed as well as, if not better than, their younger counterparts (Bhakuni & Mutha, 2015).

A well-maintained procedural memory contributes to the ability of older adults to compensate for some of their loss of speed and working memory in diverse areas including bridge playing, chess, reading, cooking, gardening, and typing (Mireles & Charness, 2002). The experienced bridge player, for example, is able to examine a round of cards without giving each individual card a great deal of thought or study. Through years of playing, many of the choices about which card to play follow established conventions and rules, so that older bridge players do not have to remember as much about each of the hand of 13 cards they are dealt for each round of play.

Implicit memory is long-term memory for information that people acquire without intending to do so. It is another long-term memory process that does not appear to be affected by the aging process (Ward, 2018). In testing implicit memory, researchers present participants with a task that involves manipulating but not necessarily remembering information. For example, you might be presented with a list of words and asked to place them into categories but not to recall them. Later, you would be asked to remember the words you had previously only been told to categorize.

Remembering where you heard or saw something is sometimes as important as remembering the information itself. **Source memory** is the recall of where or how an individual acquires information. In everyday life, you use source memory when you are trying to remember which of your friends said she would give you tickets to an upcoming concert or which professor hinted at an impending pop quiz.

Older adults seem to have greater difficulty on source memory tasks when they must judge where they saw an item on a previous occasion (Kuhlmann & Boywitt, 2016). They are also more susceptible to false or illusory memories in which they say they remember something that never happened. The age differences in source memory may be due, in part, to the tendency for older adults to form more global memories (“the gist”), which then leaves them open to false memories about some of the details that experimenters plant by inserting new information that was not part of the original stimuli (Webb et al., 2016).

However, older adults may be helped to improve their ability to overcome the susceptibility to false memory. In one intriguing study, participants were prompted to remember stops they had actually taken while on a museum tour but also shown prompts of stops they had not made. The prompts served to strengthen the memories for the stops in older adults, and in the process, reduced their susceptibility to a false memory effect (St. Jacques et al., 2015).

Another category of memory tasks involves remembering to do something that has not yet happened. **Prospective memory** encompasses the recall of events to be performed in the future. In prospective memory, you must remember your intention to perform an action, such as calling that friend who promised the tickets to decide where to meet.

Older adults commonly complain (and you may too) that they cannot remember what they were supposed to get when they went into a room. Although a nuisance, this type of forgetting is not as detrimental as the type of forgetting involved in not taking a medication at a certain time. Older people do indeed appear to have more prospective memory slips than do younger adults. Because prospective memory is so important in many real-life situations, difficulties in prospective memory seem to affect the older individual’s everyday quality of life (Woods et al., 2015).

The tip-of-the-tongue phenomenon, more formally known as **retrieval-induced forgetting**, is another source of frequent memory complaints. This is what happens to you when you are unable to remember information that you knew at one time. For example, you might forget the name of a movie one of your favourite stars was in even though you knew it very well at the time. Eventually, it might come back to you, but for several minutes, you’re just drawing a blank.

Whether in the laboratory or in everyday life, older adults seem more susceptible than younger adults to retrieval-induced forgetting. Young adults occasionally experience this effect when they are trying to retrieve an abstract word, but older people are more likely to forget a person’s name (Shafto et al., 2007), particularly when the person has a name that sounds similar to someone else’s (O’Hanlon et al., 2005). Evidence from imaging studies suggests that the area of the brain used for phonological production is subject to age-related neural declines, a fact that might explain this form of retrieval failure in older adults (Shafto et al., 2009).

One important influence on retrieval failure is the frequency with which the information is typically drawn upon for everyday use. If you rarely see or talk about a person, it is more likely that you will have trouble coming up with that person’s name should you happen to meet accidentally. Thus, when older adults must search among their larger repository of names, it requires more time and effort and they are unable to produce the correct response within the constraints of either ordinary conversation or a laboratory task. Additionally, making matters more difficult for older adults is that current common names are far more varied than they were when older adults were younger (Ramscar et al., 2014). For example, “Apple” or “Sky” has not been used as female names until recently. This means that there are even more names, many of them unfamiliar, that older adults must consider when they bump into that acquaintance on the street.

Finally, education may also play a role as an influence on retrieval failure in older adults. In one study comparing higher and lower educated older adults, there was greater interference in face-naming than word naming among the less well-educated older adults. This finding suggests that education may help buffer against at least some of the face-naming deficits associated with aging (Paolieri et al., 2018).

FIGURE 6.9

Long-Term Memory Scorecard

Abilities that decline	Abilities that are stable
Episodic memory	Semantic memory
Source memory	Flashbulb memory
False memory	Implicit memory
Retrieval failure	Procedural memory
Prospective memory	

The long-term memory and aging scorecard contrasting abilities that decline with those that are stable.

Summing up the effects of aging on long-term memory, the "long-term memory scorecard" in Figure 6.9 illustrates those memory abilities that do and those that do not show age-related declines.

Psychosocial Influences on Memory

The empirical evidence we have just covered supports in part the commonly held belief that at least some forms of memory suffer as people get older—what varies is perhaps how much, exactly which type, and when. However, there is also evidence to suggest that how you think about your memory may play just as important a role as your actual age or state of the brain.

The identity process model predicts that undue concern about memory loss can translate into an "over-the-hill" attitude of identity accommodation that turns into a self-fulfilling prophecy. Believing that their memory is failing, and experiencing such embarrassing situations as forgetting someone's name, older adults can come to believe that their minds are on a hopeless downhill course. Evidence suggests that middle-aged adults are highly sensitive to age-related changes in memory (Whitbourne & Collins, 1998), but how does this sensitivity affect their actual performance?

Memory self-efficacy is a form of self-efficacy that refers to the confidence you have in your memory; specifically, the degree to which you feel that you can successfully complete a memory task. This should, in turn, affect how well you actually perform. Unfortunately, people feel less and less confident about their memory and consequently their self-efficacy suffers (West et al., 2013). Adding to this is the fact that people with objectively poorer cognitive function also feel less confident in their memory abilities (Payne et al., 2017), further placing them at risk for suffering continued memory losses. These negative beliefs can further affect their memory self-efficacy and feelings of depression (Cherry et al., 2019).

An impressive display of the power of memory self-efficacy comes from a six-year longitudinal study conducted in the Netherlands of a healthy community sample of more than 1,800 individuals aged 55 and older (Valentijn et al., 2006). Individuals with a lower sense of memory self-efficacy, particularly with regard to the belief that their memory had declined, showed poorer memory performance over the course of the study. Whether their lower self-efficacy caused their poorer performance or whether it reflected actual negative changes was impossible to determine. Similarly, although not specifically focused on memory self-efficacy, in a large representative U.S. sample of adults aged 55 and older, Zahodne et al. (2015) observed positive relationships between overall self-efficacy and working memory, even among older adults with lower hippocampal volumes (Zahodne et al., 2018).

An older individual's **identity** and self-efficacy may also be influenced by social attitudes towards aging. This makes the older adult more likely to experience **stereotype threat**, a concept drawn from research on the standardized test performance of African Americans suggesting that people perform in ways consistent with negative stereotypes of the group to which they see themselves as belonging (Steele et al., 2002). Research on stereotype threat and aging suggests that the older person's self-identification as "old" contributes to lower memory test scores. Because older adults are stereotyped as having poorer memories, this belief causes poorer performance. Although older adults can overcome stereotype threat through identity assimilation (Whitbourne & Sneed, 2002), it is difficult to resist the "essentialist" views of aging as involving inevitable memory decline (Weiss, 2018).

Researchers in the area of stereotype threat and aging propose that identification with negative images of aging interferes with memory performance in older adults by lowering their feelings of self-efficacy. Ultimately, they become less able to take advantage of mnemonic strategies, systematic procedures designed to enhance memory such as ROY G. BIV to remember the colours in the rainbow (Hess et al., 2003). The effect, furthermore, seems particularly pronounced when stereotype threat is invoked prior to the retrieval phase of memory rather than prior to encoding (Krendl et al., 2015). However, in keeping with the premise of identity process theory, people vary in the way they respond to stereotype threat; sometimes, the oldest participants are the least rather than the most affected by stereotype threat. Supporting this view, one study of aging and stereotype threat showed that the oldest participants (those in their 80s) were least affected by these negative unconscious attitudes (Hess & Hinson, 2006). Although identity processes were not investigated in this particular study, the investigators proposed that individual differences in response to threat may mediate the way that older individuals react to negative information about aging and memory.

Some may go so far as to say that there is no way of knowing just how much stereotype threat could account for many of the findings on aging and memory. The slightest hint of a memory test can be enough to activate stereotype threat, ultimately leading to poorer performance by older adults. In a study comparing traditional and non-traditional instructional conditions in relation to memory for trivia, age differences were observed in the traditional, but not the non-traditional, instructional condition (Rahhal et al., 2001). Conversely, when older adults are encouraged to view aging from a positive perspective, their memory performance is enhanced, even in those who feel negatively about getting older (Fernandez-Ballesteros et al., 2015).

Memory controllability refers to beliefs about the effects of the aging process on memory, such as the extent to which the individual believes that memory decline is inevitable with age (Lachman, 2006). Older people who rely heavily on identity accommodation are more likely to hold negative beliefs about their ability to control their memory as they age (Jones et al., 2009). If people believe that they can control their memory, however, then they are more likely to take advantage of the strategies to ensure that they actually do achieve higher performance (Lachman & Andreoletti, 2006).

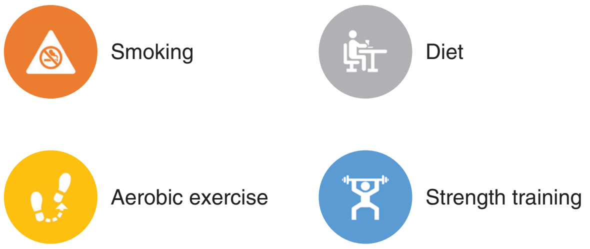
The importance of identity also became highlighted indirectly as part of the Australian Longitudinal Study of Aging (ALSA) carried out from 1992 to 2004 (Luszcz et al., 2015). The older adult participants in this study (65 to 100 years at first test) completed several measures of subjective memory beliefs and complaints about their memory as well as a recall task and measures of functional health. Contrary to prediction, changes in memory complaints did not correlate overall with changes in memory. Instead, it seemed that participants "attribute to themselves and take responsibility for their memory decline" (p. 248). This appears to be very much like the process of identity accommodation in which older individuals, especially the ones who are vigilant about their memory, become overly pessimistic as they evaluate their own cognitive performance.

Memory and Health-Related Behaviours

Given the relationship of various health-related behaviours to the functioning of the central nervous system, as we discussed in Chapter 4, it should be no surprise that memory in later adulthood is also related to health-related behaviours (see Figure 6.10). For example, cigarette smoking is known to cause deleterious changes in the brain over the long term, although short-term effects may include a temporary boost in cognition (Campos et al., 2016). One longitudinal study conducted in Scotland provided impressive data showing that people tested as children who eventually became smokers had significantly lower memory and information processing scores when followed up at ages 64 and 66, controlling for early life intelligence (Starr et al., 2007).

FIGURE 6.10

Health Behaviours and Memory



Memory in older adults can be modified through these four health-related lifestyle factors.

A second health-related behaviour relevant to memory involves diet and specifically the consumption of fish. You have probably heard the saying that fish is "brain food"; evidence suggests that it can be, particularly fish high in omega-3 fatty acids (such as salmon or tuna). Participants in the large-scale Chicago Health and Aging Study (with over 3,700 participants) were followed over a six-year period during which they were asked to report their food consumption. Approximately 20 percent of the sample ate two or more meals containing fish per week. Controlling for a host of relevant factors, the rate of cognitive decline in individuals who consumed one or more fish meals a week was reduced by 10 to 13 percent per year (Morris et al., 2005). A subsequent study of nearly 900 older adults from England and Wales showed that socioeconomic status may also play a role in the relationship between cognitive performance and fish consumption, in that people with higher social status are more likely to include fish in their regular diets (Dangour et al., 2009).

Investigators continue to search for sources of natural dietary supplements, vitamins, minerals, and flavonoids in enhancing cognitive functioning for individuals experiencing normal aging and who therefore do not have neurocognitive disorders or mild cognitive impairment. One comprehensive review of 28 studies involving more than 83,000 individuals evaluated vitamin B12, folic acid, vitamin B6, beta-carotene, vitamin C, vitamin E, selenium, vitamin D3, calcium supplements, zinc, copper, and antioxidant vitamins. There were no demonstrated effects of any of these supplements on cognitive function, with the possible exception of antioxidant vitamins (Rutjes, 2018). In part, this failure to demonstrate positive effects of most supplements may be due to the short-term nature of the studies.

Although not a supplement, one popular natural memory "cure," however, is known to show no effects at all. It continues to be marketed as such, and that is ginkgo biloba (Snitz et al., 2009). Similarly, the protein found in jellyfish (apoaequorin), the chief ingredient of the widely advertised supplement "Prevagen," has no effects on cognitive functioning (Morrill et al., 2017) despite the claims it makes in its commercials.

In Chapter 4, we saw that aerobic exercise can contribute to increases in brain areas involved in cognition. Research on exercise and cognition repeatedly illustrates that attention, memory, accuracy, and information processing all improve with each heart-pumping activity session, although the mechanisms by which these improvements occur remains unclear (Erickson et al., 2009; Marks et al., 2009). Moderate- to high-intensity strength training contributes to more efficient information processing (Chang & Etnier, 2009) and the ability to make decisions (Liu-Ambrose et al., 2010). To be most effective, older adults benefit from exercise that focuses on functional training with, for example, resistance bands, rather than exercise that is more focused on recreation (Ponce-Bravo et al., 2015).

Exercise may have indirect effects on memory by helping older adults feel stronger and more competent. Research on exercise self-efficacy and control beliefs among a group of older adults engaged in a strength training intervention demonstrated that higher exercise beliefs during the intervention were related to higher levels of resistance and maintenance of exercise after the intervention (Neupert et al., 2009).

Health may also play a role in cognition through the route of metabolic factors. As we saw in Chapter 5, people with metabolic syndrome are at increased risk for Alzheimer's disease. Impaired glucose tolerance, a component of metabolic syndrome, shows a clear relationship to cognitive functioning in normal aging individuals (Di Bonito et al., 2007). Older adults with type 2 diabetes are more likely to experience slowing of psychomotor speed as well as declines in executive functioning (Yeung et al., 2009).

One possible route through which metabolic factors can affect psychomotor slowing and memory involves insulin growth factor-1 (IGF-1). Among 1,320 cognitively unimpaired participants ages 50 and older in the Mayo Clinic Study of Aging, higher levels of IGF were associated with improved attention and overall cognition, including visuospatial abilities, but only in women. These relationships were independent of walking speed, a measure of functional health (Wennberg et al., 2018).

As we also discussed in Chapter 5, health-related behaviours include those that are involved in the management of stress. Given that stress takes its toll on health and emotions, it makes sense that it would also affect cognitive functioning. You undoubtedly have had the experience of forgetting something important when you were preoccupied with other concerns such as financial strains, increased demands at school or work, or problems in your close relationships. Researchers investigating this issue have provided support for the notion that stress can interfere with memory performance among older adults. In one intriguing investigation, a sample of more than 300 older adults in the Veterans Affairs Normative Aging Study were asked to keep a daily diary of their interpersonal stressors and their memory failures. By tracking the relationship of stressful experiences to memory on a daily basis, researchers were able to establish the lagged effect showing that stressors on one day predicted memory failures on the next (Neupert et al., 2006).

Interference of emotions, such as feelings of depression, may also contribute to poorer performance in older adults by depleting valuable cognitive resources (Meijer et al. 2009). A prospective longitudinal study of widows (begun before the widows had lost their husbands) confirmed this idea among older women. Independent of the effect of losing a spouse on depressive symptoms, women in the Longitudinal Aging Study Amsterdam were found to have lower memory performance at the end of a six-year period. Although the women who eventually lost their husbands started out with lower memory scores, even after controlling for this difference, the widows showed greater memory loss than did the non-widows over the course of the study (Aartsen et al., 2005).

Looking directly at memory performance and its relationship to stress, another group of investigators provided impressive evidence to support the idea that the deficit shown by older adults on working memory tasks can be accounted for in part by the experience of daily stressors (Stawski et al., 2006). In this study, a group of more than 100 older community-living adults with intact mental status were compared with young adults on the n-back working memory task. The amount of daily stress in their lives was determined through an interview in which participants were asked questions such as, "Did you have an argument or disagreement with anyone?" and "Did anything happen to a close friend or relative that turned out to be stressful for you?" Testing occurred over six occasions, allowing the investigators to examine within-person variations in the relationship between stress and memory as well as between-person age group differences.

Interestingly, the young adults in the sample were more likely to say "yes" to these and the other four questions assessing interpersonal stress. For instance, young adults said they had an argument on 26 percent of the days on which a given stressor occurred compared to 5 percent for older adults. The study's main finding was that on days in which people experienced stress, the performance of people in both age groups was significantly poorer. Emotional strain can interfere with memory in anyone regardless of age.

Why does stress have this impact on memory? Stawski and his colleagues (2006) maintain that preoccupation with stress occupies attentional resources that could otherwise be devoted to the memory task. There is evidence that older adults are perhaps more anxious than younger adults about their memory performance and therefore their memories are more vulnerable to this emotional interference (Andreoletti et al., 2006).

A final factor to consider in understanding the relationship between memory and health is that of sleep. In young adults, long-term memory is strongly linked to slow-wave sleep. Experimental subjects allowed to sleep in between learning and testing consistently achieve better memory performance than participants who spend an equivalent period of time awake (Diekelmann et al., 2012). Indeed, as shown in the Canadian Longitudinal Study on Aging, there is a link between chronic insomnia and memory performance, even after controlling for other health-related factors (Cross et al., 2019).

Memory Training Studies

One mission of aging and memory research is to find ways to help older adults offset deleterious changes in memory. Many researchers in this field are true "gerontological optimists" who believe that their work can help improve cognitive functioning in older adults. They have established, for example, the fact that even simple practice can produce significant improvements in memory task performance, offsetting the negative effects of mental inactivity. Interventions aimed at improving episodic memory can be beneficial even for individuals suffering from the clinical condition known as mild cognitive impairment (MCI).

Although the simple task of practice can result in enhanced memory performance, there are advantages to encouraging strategy use among older adults. Providing training intended to improve the memories of older adults also has the benefit of increasing feelings of the individual's self-efficacy (West et al., 2008). When this training is provided in a group setting, it can be particularly effective in boosting not only self-efficacy but also memory performance (Hastings & West, 2009).

Older adults can also benefit from interventions that provide them with additional support during the encoding stage, while they are inputting information into long-term memory (Craik & Rose, 2012). This support can take the form of additional cues such as having them see pictures as well as words when learning a word list. Older adults would benefit, according to this approach, by using "deep" processing, in which they think about the meaning of the information they are trying to remember rather than simply repeating information by rote.

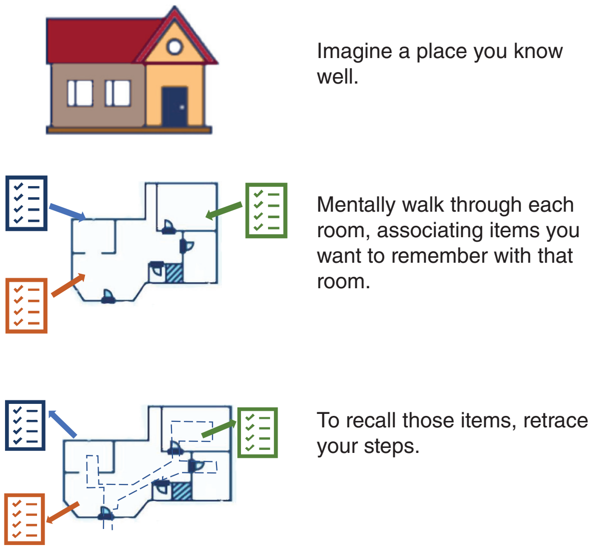
One of the most ambitious cognitive training interventions is a multisite study known as Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE) that was carried out over a two-year period on more than 2,800 adults 65 to 94 years of age (Ball et al., 2002). Training consisted of 10 one-hour sessions over a five- to six-week period. The participants were trained in one of three types of cognitive skills—memory, reasoning, or speed of processing—while a control group received no training. These cognitive functions were selected because they show the most improvement in laboratory work and are related to everyday living tasks (e.g., telephone use, shopping, food preparation, housekeeping, laundry, transportation, medication use, and management of personal finances). For instance, those who received memory training were taught ways to remember word lists and sequences of items, text, and the main ideas and details of stories. Training in the area of reasoning involved learning how to solve problems that follow patterns, such as reading a bus schedule or filling out an order sheet. Training in speed of processing involved learning how to identify and locate visual information quickly for use in tasks such as looking up a phone number, finding information on medicine bottles, and responding to traffic signs.

Testing conducted at the end of the training period demonstrated that the majority of participants in the speed (87 percent) and reasoning (74 percent) groups showed improvement; about one-quarter (26 percent) in the memory group showed improvement. Two years later, the gains were still evidenced, although they were larger for participants who participated in booster sessions.

These gains continued over the decade following the conclusion of training. In the 10-year ACTIVE follow-up (Rebok et al., 2014), improvements in memory persisted to at least 5 years for memory training and up to the full 10 years for reasoning and speed-of-processing training. Furthermore, a large proportion (60 percent and over) reported having less difficulty performing IADLs, and 60 to 70 percent felt they were as well off as, or better, than before they were at the beginning of the training.

FIGURE 6.11

Method of Loci


Imagine a place you know well.
Mentally walk through each room, associating items you want to remember with that room.
To recall those items, retrace your steps.

The use of method of loci as a way to improve long-term memory.

Memory training not only can improve an individual's performance but can even alter the brain. In a study carried out in Norway, middle-aged and older adults learned to use the "method of Loci" (associating words with rooms in your home) (Figure 6.11). They were given intensive training, involving 25-minute sessions, five days a week, for eight weeks. Compared to a control group, the training group showed increased white matter density, a change that would help them process new information more quickly and efficiently (Engvig et al., 2012). In the ACTIVE study, training in method of loci helped older adults become more consistent in their use of this strategy, producing both immediate and long-term memory improvement (Gross et al., 2014).

In conclusion, attentional and memory processes in adulthood play vital roles in life. Older adults appear to suffer deleterious changes, but these changes are neither universal nor irreversibly negative. Identity and other memory-related beliefs play an important role in determining whether individuals are able to take advantage of compensatory strategies. Future research will help uncover more of these personality-memory linkages as well as to identify which strategies can be most effective in maximizing cognitive performance throughout middle and later adulthood.

SUMMARY

1. Cognition refers to the way the mind works, including the processes of attention, memory, intelligence, problem-solving, and the use of language. Aging affects each of these areas, leading to changes in many people's ability to carry out everyday activities. Processing speed, measured by reaction time, is an important variable in research on cognitive aging. There is a consistent increase in reaction time throughout adulthood. The general slowing hypothesis

explains this increase as a decline of information processing speed, and the related age-complexity hypothesis proposes that the loss is greater for more difficult tasks.

2. Attention involves the ability to focus while ignoring other features, to shift that focus, and to coordinate information from multiple sources. Laboratory studies suggest that people become less efficient in the use of attentional processes with age. Multitasking involves the ability to monitor multiple input sources, with older adults experiencing greater disadvantages. Inhibitory control refers to the process of turning off one response while performing another and is often measured using the Stroop test. Studies on aging and attentional performance suggest that not all abilities decline. Two approaches to understanding age differences in attentional tasks include the attentional resources theory and the inhibitory deficit hypothesis. Experience can compensate for age-related changes in sustained attention. Based on research suggesting the attentional benefits video games offer to younger adults, researchers are beginning to explore the use of video games in interventional studies as training tools to enhance attentional skills among older adults. Older adults prefer computer games to first-person shooter video games, which may benefit focused and sustained attention.
3. Challenges facing older adult drivers include age-related increases in reaction time and changes in visual functioning. However, accidents per mile driven are higher among younger drivers, perhaps due in part to increased rates of drinking and driving and engaging in distracting behaviours. Older adults compensate for changes in driving ability by modifying behaviours and relying on experience.
4. One of the greatest fears about aging is the loss of memory and, indeed, data suggests that the aging process has negative effects on many, but not all, aspects of memory. Working memory, which keeps information temporarily available and active, is significantly poorer in older adults. However, individuals can compensate for these declines by activating different neural circuits.
5. Long-term memory refers to information that is held from several minutes to a lifetime and includes various types; these are impacted by age differently. Episodic, remote, and autobiographical memory are sensitive to age effects, with the exception of a phenomenon known as the reminiscence bump, the period of time between the ages of 10 and 30. Flashbulb memory and semantic memory are not affected by the normal aging process. Procedural memory is also retained in older adults, as is implicit memory. However, older adults have more difficulty with tasks involving source memory and prospective memory.
6. Researchers are investigating the interaction of memory changes with changes in self-efficacy, control beliefs, and identity. The concept of stereotype threat implies that older adults may perform more poorly on memory tasks that activate negative stereotypes about aging and memory.
7. Memory in later adulthood is related to a variety of health-related behaviours that promote cardiovascular and metabolic health. Aerobic exercise can contribute to increases in brain areas involved in cognition. Health may also play a role through the route of metabolic factors. Impaired glucose tolerance, a component of metabolic syndrome, shows a clear relationship to cognitive functioning in normal aging individuals. Stress can also interfere with memory performance.
8. Interventions aimed at improving episodic memory can be beneficial, particularly those that teach strategy use among older adults. One of the most ambitious cognitive training interventions was a multisite study known as Advanced Cognitive Training for Independent and Vital Elderly (ACTIVE), which found that training in memory and reasoning improved the performance of older adults on daily living tasks, gains that were maintained over a 10-year period.

7

Higher-Order Cognitive Functions

Think you're good at solving problems? Answer True or False to each of these 10 statements and check your answers on the next page:

AGEFEED

test yourself

1. You don't always need to be right.
2. Asking for help is how you learn from others and see different perspectives.
3. You visualize the worst-case scenario and ways to get out of that scenario.
4. Problems are challenges that you use as learning opportunities.
5. You tend to be a positive thinker and surround yourself with like-minded people.
6. You look for more than one solution to a problem and have backup plans for as many scenarios as possible.
7. You don't have a lot of drama or stressful interactions in your life.
8. You make decisions based on fact rather than intuition.
9. When it comes to solving problems, you take your time to think through all possible solutions.
10. You look for feedback from others when solving a problem.

AGEFEED

...the scores

All of these are excellent problem-solving approaches. Here's what your score means:

Mostly Trues—*You are an expert problem solver who can adapt to different situations and don't seek confrontation!*

Mix of Trues and Falses—*You may not be an expert problem solver, but chances are you will get better with age and experience!*

Mostly Falses—*Problem-solving may not be your strong suit, but that's okay, many people become better at solving certain kinds of problems with age!*

Information processing and memory are basic cognitive operations that make it possible for you to perform a variety of critical adaptive functions in your everyday life. They also form the basis for your ability to analyze, reason, and communicate with others.

Researchers are interested in understanding higher-level cognitive functions in adulthood and later life for a number of reasons. First, these functions play a major role in areas such as educational success, health, occupational performance, and even relationships. Second, information on the way that individuals think and learn in later adulthood can provide a greater understanding of the potential everyone has for benefiting from educational opportunities throughout life. With many adults retooling in order to find new positions in the rapidly changing labour market, educators and employers must find ways to help people past traditional school age prepare for incorporating technological and other advances into their work. Finally, there are practical applications of this knowledge in the area of diagnosis and treatment for the neurocognitive disorders that can develop in middle and later adulthood.

EXECUTIVE FUNCTIONING AND ITS MEASUREMENT

The higher-order cognitive skills needed to make decisions, plan, and allocate mental resources to a task are called **executive functioning**. Specifically, an individual's executive functioning draws upon several abilities, including working memory, selective attention, mental flexibility, and the ability to plan and inhibit distracting information (Miyake et al., 2000).

Clinicians and researchers are particularly interested in learning how aging affects executive functioning because it is central to so many activities that older adults need to use in order to be able to care for themselves. For example, driving depends heavily on speed but, just as importantly, on executive functioning due to the need to be able to plan and make decisions while you are behind the wheel (Adrian et al., 2019). You need to use your executive functions to determine the route to take to your destination, alternate between input from the road and that of your vehicle's dials and instruments, and make any changes in your route to account for traffic, construction, or obstacles in the road. Studies on aging and executive functioning are also increasingly focusing on interventions that can protect and maximize these important skills.

Intelligence Tests

The higher-order cognitive functions that make up executive functioning contribute, at least in part, to an individual's overall intelligence. An **intelligence test** provides an assessment of an individual's overall cognitive status along a set of standardized dimensions. The scores on an intelligence test may be used in a research context, particularly when investigators are seeking to understand the effects of aging. They are also used by clinicians as part of a larger neuropsychological evaluation to establish a diagnosis of a neurological or psychiatric disorder. Psychologists working in human resource departments may also use intelligence testing as part of a larger process of personnel selection or evaluation.

Through intelligence testing, psychologists obtain a set of standardized scores that allow them to evaluate the cognitive strengths and weaknesses of their research subjects, clients, or personnel. The most commonly used intelligence tests in clinical settings are on a one-to-one basis, providing a comprehensive view of the client's abilities to perform a range of perceptual, memory, reasoning, and speeded tasks.

The **Wechsler Adult Intelligence Scale (WAIS)** is one of the most well-known individually administered intelligence tests. Originally developed in 1939 by David Wechsler as the Wechsler-Bellevue test, the WAIS, first published in 1955, is now in its fourth edition (WAIS-IV) (Wechsler, 2008). Intended as a tool to be used for assessing psychiatric patients, the WAIS first contained scales that measured "verbal" abilities and a second set that measured "performance." The scores on these scales have the abbreviation "IQ," for "intelligence quotient," although technically they were not quotients. The WAIS IQ scores were actually calculated by comparing a person's raw scores with the norms for that person's age group, with the IQ score constituting deviation from those age-adjusted norms. As the terms imply, Verbal IQ tests knowledge of such areas as vocabulary and general information. Performance IQ tests measure non-verbal abilities such as spatial relationships and reasoning.

In the versions prior to the WAIS-IV, people received Verbal and Performance IQ scores along with an overall IQ. The test developers of the WASI-IV decided to revise the scoring system to reflect developments in the fields of neuropsychology and cognitive psychology. Furthermore, some of the test items and stimuli had become outdated and needed to be replaced. The WAIS-IV includes new test items, several new tests, and a completely different scoring system.

The four indexes that the WAIS-IV produces, as you can see from Figure 7.1, are Verbal Comprehension, Perceptual Reasoning, Working Memory, and Processing Speed. There are 10 standard tests and 5 optional tests, not shown, which the examiner may give depending on the specific purpose of the assessment. The Full-Scale IQ reflects general cognitive functioning but is perhaps less informative than the four index scores, each of which captures a different facet of the individual's strengths and weaknesses.

One scale of Perceptual Organization is the Raven Progressive Matrix Reasoning test, shown in Figure 7.2. Each row shows a progression as the dark-shaded quadrant occupies positions starting from the top left to the bottom right. The test taker would decide which of several choices would fit into that empty square.

In addition to scoring the individual's responses, the examiner would also record any relevant behaviours or concerns that could affect the test taker's scores. These could include fluency in the language of administration, problems with vision or hearing, and difficulties with attention and concentration.

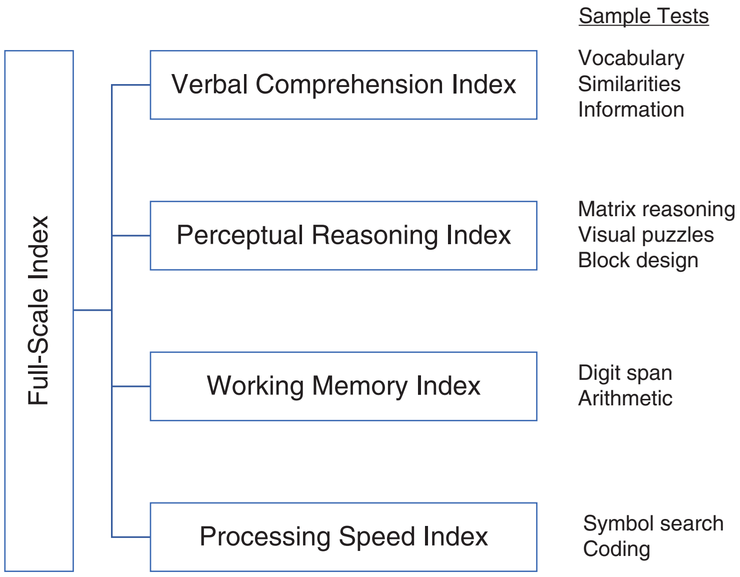

Sample Tests
Full-Scale Index
Verbal Comprehension Index
Vocabulary
Similarities
Information
Perceptual Reasoning Index
Matrix reasoning
Visual puzzles
Block design
Working Memory Index
Digit span
Arithmetic
Processing Speed Index
Symbol search
Coding

FIGURE 7.1

Components of the Wechsler Adult Intelligence Scale-IV

The WAIS-IV provides scores on four subscales that can be combined into a full-scale index. Each subscale, or index, is assessed by sample tests shown here.

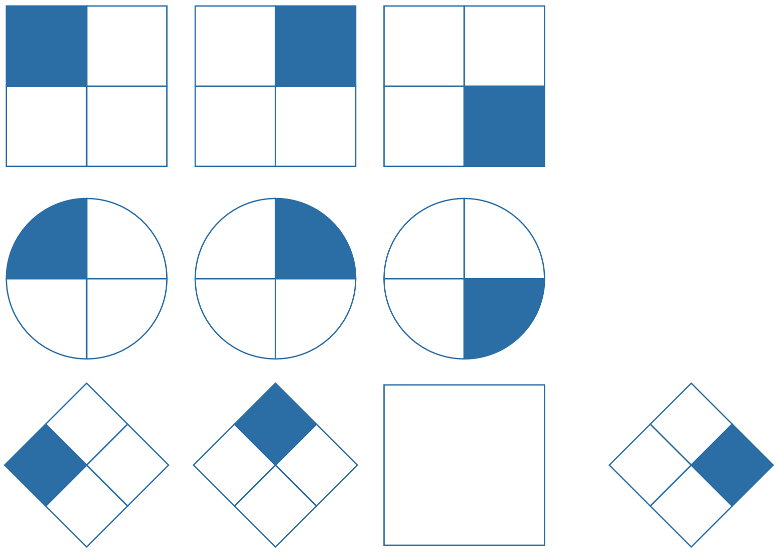


FIGURE 7.2

Sample Perceptual Item from the WAIS-IV

A sample item from the Raven Progressive Matrices where the task is to choose the next pattern that would go in the series, as shown here.

Such observations could be helpful in further interpreting the individual's numerical score.

Although not currently in use by clinicians, another intelligence test worth noting is extensively used in research on aging. The **Primary Mental Abilities Test (PMAT)** assesses the seven abilities of Verbal Meaning, Word Fluency (the ability to generate words following a certain lexical rule), Number (arithmetic), Spatial Relations, Memory, Perceptual Speed, and General Reasoning. Unlike the WAIS-IV, psychologists administer the PMAT in a group format rather than an individualized manner, which also makes it more practical for research purposes. The PMAT's scales roughly parallel at least some of those included in the WAIS-IV's, such as Memory and Working Memory, and Perceptual Speed and Processing Speed.

Neuropsychological Assessment

There are a variety of specialized tests that can evaluate an individual's cognitive status, including the quality of executive functioning. The process of **neuropsychological assessment** involves gathering information about a client's brain functioning from a series of standardized cognitive tests. In cases involving older adults with cognitive deficits, in particular, neuropsychologists may adapt their assessment to try to target the specific area in the brain that they believe has suffered damage or decline. They conduct this assessment individually rather than in a group format.

Tests of executive functioning are typically part of the total process of neuropsychological assessment. However, most neuropsychological assessments of older adults also include other measures of cognitive functioning and may incorporate some we have already discussed as part of intelligence testing. There are enough available neuropsychological tests within each category so that if a clinician wishes to investigate one area in depth for a particular client, then he or she will be able to probe into the individual's possible disorder by administering more tests from that category.

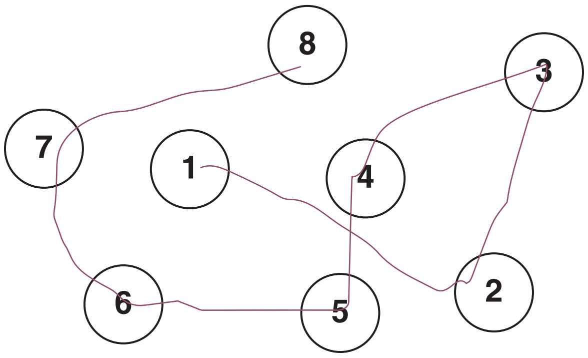
You might be surprised to learn that there is no one set procedure for conducting a neuropsychological assessment. In fact, particular neuropsychologists may have preferences for certain tests, especially if they tend to see the same type of client in their practice or their area of research expertise. In clinical settings, though, neuropsychologists are expected to have training in enough types of tests to be able to adapt the assessment to the individual's symptoms. In working with older adults, neuropsychologists are also expected to be familiar with the tests that are appropriate for people in this age group rather than those used in diagnosing a child or adolescent.

Several neuropsychological tests are either derived from or the same as tests from the WAIS-IV, such as Digit Span (used to assess verbal recall and auditory attention) and Similarities (used to assess verbal abstraction abilities). Other tests, such as the Trail Making Test, also called "Trails," were developed specifically to assess the individual's so-called "frontal lobe functioning," which includes attention, visual scanning ability, and numerical sequencing (see Figure 7.3). The examiner shows the test taker a pattern of numbered circles, with the instructions to draw lines to connect the circles in order. Another variant of the Trail Making Test displays a pattern of numbered circles and letters, and the test taker's job is to connect them in order from 1 to A to 2 to B, and so on.

The Wisconsin Card Sorting Test (WCST) measures the individual's ability to form mental sets in categorizing cards with related features, such as number of items, colour, or shape. The WCST is now administered on a computer rather than with physical cards, reflecting a growing trend in neuropsychology to use computerized test batteries. A sample item from the WCST is shown in Figure 7.4. The three yellow diamonds could be an example of the colour yellow (which would fit with card 2), the number 3 (fitting with card 4), or triangles (card 1). By your series of choices, you should eventually learn which concept should be used for classifying the cards (such as yellow). Once you have that concept, a new concept would be introduced and you would have to learn that concept next (such as the number 3).

FIGURE 7.3

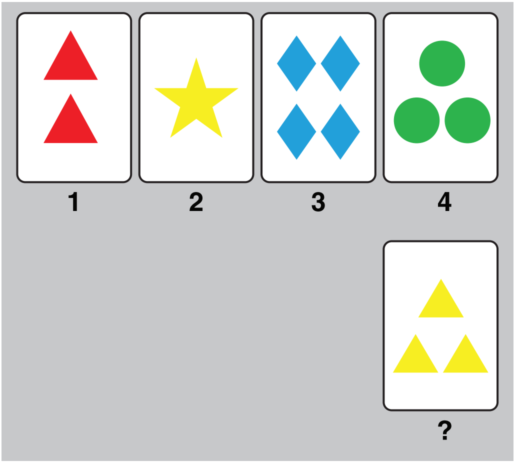
Example of Trail Making Test



In the Trail Making Test, the individual must draw a line connecting the circled numbers in sequence.

FIGURE 7.4

Wisconsin Card Sorting Test



The Wisconsin Card Sorting Test is a measure of the ability to adapt to changing rules of organization. The test taker is shown screens with a set of four stimuli and must guess whether the stimulus shown below matches or not.

In addition to the convenience factor, computerized testing allows the psychologist to administer an adaptive testing, in which the client's responses to earlier questions determine which questions will be subsequently asked. For example, the Cambridge Neuropsychological Testing Automated Battery (CANTAB) consists of 22 subtests that assess visual memory, working memory, executive function and planning, attention, verbal memory, decision-making, and response control. Having these tests on a laptop or tablet device has clear advantages to handling the equipment needed for 22 (or more) physical tests. However, there may be drawbacks to the use of computerized assessment for current cohorts of older adults who may have limited experience taking tests in this format. The psychologist must take this into account when evaluating the results.

Aging and Executive Functioning

Researchers conducting laboratory studies that examine the relationship between age and executive functioning may draw from the intelligence and neuropsychological tests we have just discussed. Additionally, they may employ specific measures designed to pinpoint a particular type of executive functioning. One measure that taps cognitive flexibility is the task-switching method, in which participants respond to one type of stimulus in one set of trials (judging if a number is odd) and the opposite in the next set of trials (judging if a number is even). Thus, the first set of trials leads participants to adopt a particular decision rule, which they must then change in responding to the second set of trials.

Another experimental task measures verbal fluency, a form of executive functioning that depends on the individual's ability to generate multiple items meeting a single criterion. Tests of verbal fluency ask respondents to produce as many items as possible in response to one stimulus, such as listing as many people words that begin with the letter "K" in a set amount of time. However, because it is dependent on language, verbal fluency tests may not be pure measures of executive functioning (Whiteside et al., 2016).

Scores on measures of executive functioning appear to show steady declines in later adulthood, though most of the research is cross sectional, and therefore cannot detect age changes. In one four-year longitudinal study of older adults, there were no changes in overall measures of executive functioning; additionally, language scores improved (Castellano et al., 2019). These declines are important because they are related to negative changes in a number of everyday cognitive functions that individuals need in their daily lives (Overdorp et al., 2016). Interestingly enough, older adults themselves may not perceive themselves to be affected by these changes in their own self-reports of their ability to manage their daily tasks (Tucker-Drob, 2011). It is possible that this self-perception reflects the process of identity assimilation due to older adults' desire to see themselves as cognitively in control of their lives.

Performance on the WCST appears to be maintained through midlife (Garden et al., 2001). Age-related effects start to become apparent by later adulthood, however (Head et al., 2009). These changes may be related to changes in regions of the brain that support the ability to plan, make decisions, and adapt flexibly to changing situations (Burzynska et al., 2012).

Furthermore, differences among older adults in background factors such as education can also play a role in influencing performance on measures of executive functioning. One study of verbal fluency showed that older adults were more likely to perseverate, meaning that they continue to produce the same words, such as "king," "keel," "kept," "king," and "kite," where "king" counts as a perseveration. However, the tendency to perseverate is less evident in people with higher levels of verbal abilities (Methqal et al., 2019).

Fortunately, there are ways in which older adults can perhaps compensate for these changes in executive functioning. Following similar models as studies on brain plasticity, researchers are showing that physical exercise can benefit executive functioning in older adults. Not only do people who exercise have better executive functioning, but also experimental studies show that aerobic exercise training improves performance on tests of mental flexibility, attention, and inhibitory control (Erickson et al., 2019). Lifetime habits of greater physical activity also help to preserve executive functioning in older adults. In one long-term investigation following individuals from adolescence through later life, positive effects of physical activity among older adults were associated with better cognitive functioning, effects even stronger in those who had lifetime habits of physical exercise (Reas et al., 2019).

Videogames would also seem to have positive effects on executive functioning, given that even casual games readily available on the market often require players to switch targets and the games themselves require multiple strategies for winning as players move through a game's levels. However, one comprehensive investigation of a novel videogame package intended to promote cognitive flexibility through a 12-week training program showed no effects other than improvements in game-playing itself (Buitenweg et al., 2017). As discussed in Chapter 6, although these games might be enjoyable to players, it is still premature to regard videogame interventions as having measurable real-life effects.

Another approach combines physical exercise and videogame playing. Known as "exergaming," in this approach players ride an exercise cycle while playing videogames on a screen in front of them. One initial study investigated exergaming's impact on trail making performance after a three-month intervention. The older adults who exercised more often, more rigorously, and did more complex tasks showed improvements (Barcelos et al., 2015). However, the question of just how different exergaming is from physical activity in general has yet to be determined (Stojan & Voelcker-Rehage, 2019).

As research on videogame training and executive functioning continues, it is likely that as the training tasks become better understood, more robust transfer to everyday abilities will be demonstrated.

LANGUAGE

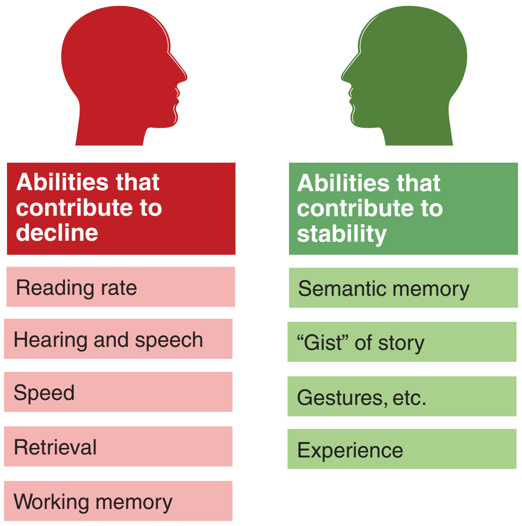
The use of language involves a wide range of cognitive functions, including comprehension, memory, and decision-making. As we discussed in Chapter 6, many of these functions are negatively affected by the aging process. However, the majority of researchers believe that the average healthy older adult does not suffer significant losses in the ability to use language effectively under normal speaking conditions (Shafto & Tyler, 2014). The basic abilities to carry on a conversation, read, and write remain intact throughout later life. The "Language and Aging Scorecard" in Figure 7.5 summarizes this research.

Cognitive Aspects of Language

Although many cognitive functions relevant for language are preserved in older adults, the scorecard shows that there are changes that can have a detrimental effect on the older adult's ability to use and maximize language most effectively. One of the most significant is a slower processing speed while reading (Malyutina et al., 2018). While reading, older adults may have greater difficulty forming visual images to accompany concrete words, a process that can benefit the memory of younger adults for written material (Huang et al., 2012). While reading, older adults appear to preserve the ability to process and remember general features of a story but are less likely to remember specific details. Consistent with the CRUNCH model of neuroplasticity, however, it seems that older adults appear to compensate for

FIGURE 7.5

Aging and Language Scorecard



The language and aging scorecard shows which abilities contribute to decline in language skills with aging and which contribute to stability.

changes in comprehension ability by activating more neural circuits than do younger adults (Martin et al., 2018).

As we saw in Chapter 4, changes in hearing and speech perception have the potential to influence the ability to comprehend spoken language. For example, older adults may find it more difficult to hear all the words spoken in a conversation; they then must work harder to make sense out of what other people are saying (Janse, 2009). More generally, hearing deficits create additional strain on an older adult's processing resources, so that semantic judgements that would otherwise be automatic now require more effort. These changes negatively impact working memory and hence the individual's ability to correctly identify spoken words (Peelle & Wingfield, 2016).

In using written language, retrieval errors could make it more difficult for them to correct misspelling. In one study of proofreading, older adults were found to be able to detect errors but not to be able to correct those errors (Shafto, 2015).

Adults' slower cognitive processes may also have an effect on the complexity of grammatical structures that they use. As you form sentences, you must keep one clause in mind while you compose the next one, a process that places demands on your working memory. As we saw in Chapter 6, working memory undergoes significant changes with age. Consequently, compared with young adults, older adults speak in simpler sentences (Kemper et al., 2001). Their writing also becomes simpler, in both the expression of ideas and the use of grammatical complexity (Kemper et al., 2001). Thus, although older adults retain their knowledge of grammatical rules (a form of semantic memory), declines in working memory can cause older adults to lose track of what they mean to say while they are saying it, especially when the language they are producing requires thought and preparation (Harley et al., 2011).

Interestingly, the speeches and interviews given by political figures allow for unique insights to be gained in the nature of language production by older adults. An analysis of President Donald Trump's interviews showed an increase in filler words prior to his election in 2016 although there were no comparable measures of cognitive ability against which these changes could be compared (Coutanche & Paulus, 2018). As you learned already, semantic memory is not impaired by aging, meaning that older adults should have no difficulty understanding word meanings.

On the positive side, experience is another way that older adults compensate for changes in memory and speed. This is particularly true for highly educated older adults, whose extensive vocabularies allow them to take advantage of the context in language, particularly when the task is cognitively challenging (Zekveld et al., 2011). In general, though, older adults also have a rich backlog of experiences from which to draw when they listen or read, even without a rich vocabulary (Benichov et al., 2012). They can also take advantage of interpreting the paralinguistic aspects of speech, including gestures and facial expressions. You have likely encountered the experience of filling in missing information in speech that is directed towards you. Someone approaches you at a loud party, and it is probably safe to assume, even if you are unable to hear, that he or she is saying "Hello" or "What's up?" You are pretty safe in returning the greeting.

Also, on the positive side, health status may play a role in affecting language abilities of older adults. Two measures of language known to be affected negatively by aging, word finding (lexical retrieval) and sentence processing, were found by one set of researchers to be less efficient in older adults who met the criteria for metabolic syndrome (Cahana-Amitay et al., 2015). Thus, by controlling the factors that contribute to metabolic syndrome, older adults may be able to preserve key features of language processing.

In summary, older adults have well-developed structures of information that allow them to anticipate and organize information that may typically overwhelm a novice. Even in situations that do not involve expert knowledge of a skill, previous experience can make up for slower processing of new linguistic information. For example, an avid soap opera watcher can anticipate what the characters will say (and often do) rather than needing to hear every single spoken word in a particular interchange between characters. When reading magazines or newspapers, a knowledgeable older reader is able to make up for changes in working memory by relying on more effective structures for retrieving related information from written text (Payne et al., 2012).

Social Aspects of Language

Corresponding to changes in language use and comprehension throughout adulthood are changes in the way that older adults use language socially. Perhaps most striking is the tendency of older adults to reminisce with others about experiences from the past. As they do so, they often polish and refine their storytelling so that by the time their reminiscences have been practised and rehearsed, the stories have considerable impact on the listener. In your own family you may have heard an older relative tell the same story over and over again so often that you can repeat it by heart. Watching the reaction of your friends when they first hear the same story may cause you to realize that it is a pretty good story after all. This is perhaps one reason why comedians in their 60s, 70s, and beyond have become such masters of the punch line.

Reminiscences about the past may also serve a function for older adults in solidifying relationships and building shared identities with others from their generation. As they do so, they can enhance and strengthen their relationships with their long-time friends and family members.

Younger adults may become annoyed with the older adults they know well and feel that the older people's speech is too repetitive or focused on the past (Bieman-Copland & Ryan, 2001). At times, older adults may also speak more off-topic, particularly when they are giving instructions about how to perform an action. Younger adults seem to be better able to focus their speech in such situations (Trunk & Abrams, 2009). In a related vein, older adults may experience "mental clutter" due to an inability to inhibit irrelevant information. This tendency causes their speech to become somewhat rambling. However, these slight changes seem more related to altered executive functioning than to age, per se, because we know that inhibition is a key component of frontal lobe control over behaviour.

The problem of intergenerational communication is made worse if the older person tends to focus on his or her current disabilities or health limitations. Talking extensively about a topic in which the listener has no interest or that makes the listener uncomfortable can have an effect opposite to that intended and possibly isolate the older individual. Such examples highlight the downside to changes in these conversational patterns when they have the unintended effect of turning off the listener.

Intergenerational communication can take a decidedly nasty turn. **Elderspeak** is a speech pattern directed at older adults similar to the way people talk to babies. If you have ever heard an older adult referred to as "cute," or being called "honey," or "sweetie," you have heard one form of elderspeak. More generally, elderspeak involves simplifying your speech much as you would talk to a child by leaving out complex words or talking in a patronizing or condescending tone of voice. Younger people who speak in this manner do so because, either consciously or unconsciously, they equate the older and perhaps frailer adult as being equal in status to a child. Offering unnecessary help, making personal comments about clothing or appearance, or talking in short, simple sentences are just some examples of this type of speech pattern.

Researchers investigating elderspeak have proposed that its use fits into the **communication predicament model** of aging. The predicament is that older adults are thought of as mentally incapacitated, leading younger people to speak to them in a simplified manner; over time, this can reduce the older adult's actual ability to use language (see Figure 7.6). In addition, failure to encourage independent behaviours in the older person, a part

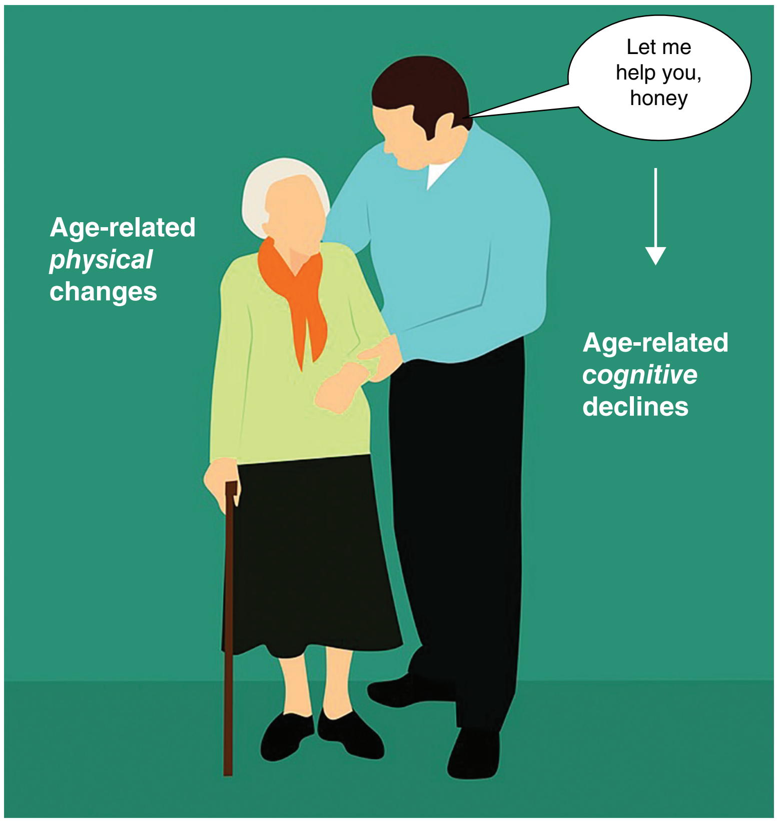

Let me help you, honey
Age-related *physical* changes
Age-related *cognitive* declines

FIGURE 7.6

Example of Communication Predicament Model

In the Communication Predicament Model, when older adults who experience age-related physical changes are treated in infantilizing ways, they can experience age-related cognitive declines.

of the communication predicament, leads to a further spiralling downward of the older person's abilities (Ryan et al., 1995).

The communication predicament model is part of a larger phenomenon known as infantilization, in which the older person loses the incentive to attempt to regain self-sufficiency in the basic activities of daily life (Whitbourne et al., 1995). Moreover, when older adults in a residential facility are treated by younger staff in an infantilizing manner, they lose the desire to socialize with each other, potentially leading to social isolation (Salari & Rich, 2001). The self-fulfilling nature of infantilization can also increase the older person's awareness of age stereotypes, causing a self-fulfilling prophecy to spread across a wide domain of areas of functioning. If you think you are unable to carry out a task because you are too old, infirm, or feeble, then the chances are you will eventually lose the ability to carry out that task. According to the analysis, infantilization may even produce symptoms of neurocognitive disorder, particularly in institutional settings where residents may feel they have no escape from the control of their caregivers (Marson & Powell, 2014).

Because infantilization results in a loss of independence, researchers believe that it is important to sensitize those who work with older adults so that they avoid falling into this pattern. These programs have started, at least within assisted living facilities (Williams & Warren, 2009), but clearly more work in this area would have wide-ranging benefits.

Bilingualism and Aging

A question that is particularly relevant in the Canadian context is, does being bilingual benefit older adults in terms of their cognitive functioning? In general, being able to speak and think in two languages is beneficial across the life span (Bialystok et al., 2009). Even if the speaker no longer relies on one of the languages, that second language remains active. This means that the bilingual speaker must add the step of deciding which language to use in a given situation depending on its context. As a result, bilingual individuals continually practise and therefore build their executive functions. This constant strengthening of their executive functioning may result in protection against the effects of Alzheimer's disease (Bialystok, 2011).

The advantage of bilingualism does not extend to all cognitive tasks. In working memory tasks, bilingual older adults seem to have greater difficulty with verbal than spatial stimuli, even after controlling for vocabulary (Luo et al., 2012). In a comparison of bilinguals to monolinguals on the Stroop interference task, which may be considered at least in part a measure of executive functioning, older bilinguals did not show a performance advantage (Kousaie & Phillips, 2012). Part of the reason for inconsistent results across studies of executive functioning among bilinguals may be that a large number of factors are at play (e.g., different tasks, experiences, mechanisms) (Valian, 2014).

Research clearly indicates that lifelong bilingualism helps to prevent cognitive decline (Bialystok, 2017). An interesting line of research in this area is the influence of bilingualism on the age of onset and progression of mild cognitive impairment (MCI) and Alzheimer's disease (AD). Bialystok and her colleagues (2014) examined 74 MCI patients and 75 AD patients recruited from the Sam and Ida Ross Memory Clinic at the Baycrest in Toronto. In each group, approximately half were bilingual and spoke a variety of other languages, including Farsi, French, Italian, Russian, and Yiddish, at least once per week. Participants were assessed on the Trail Making Test, the Color-Word Interference Test, and the Verbal Fluency Test. These tests assess flexible thinking, the ability to inhibit an automatic response, and verbal fluency, all executive functions. Participants were assessed three times over the course of about one year. The most interesting finding from this study was that bilingual older adults had a later age of disease onset and were older when they first attended the memory clinic when compared to their monolingual counterparts. While you may think that this might be due to group differences in immigration status or education, this was not the case. Lifestyle factors were also assessed; however, these too did not entirely explain the group differences. The delay in the onset of symptoms among the bilingual group was about six years, indicating that they enjoyed more years of independence and a higher quality of life. Something to keep in mind for those of you who are bilingual or interested in acquiring a second language!

EVERYDAY PROBLEM-SOLVING

From figuring out why your computer is freezing up the night before a paper is due to managing your dwindling bank account, you must constantly deal with problems requiring solutions in your daily life. Researchers have increasingly moved these daily challenges into the laboratory to evaluate the ability of older adults to manage such everyday tasks as handling their personal finances, maintaining their medication schedules, and monitoring their diets. **Everyday problem-solving** refers to the ability to solve problems that typically occur in people's daily lives, that can be solved in more than one way, and that require the problem solver to decide which strategy will lead to the desired result. The processes involved in everyday problem-solving involve key cognitive abilities as well as the contributions of education, other demographic variables, and health (Burton et al., 2006).

Characteristics of Problem-Solving

Psychologists approach the topic of problem-solving by identifying types of problems and the stages involved in successfully approaching and resolving them. Essentially, problem-solving involves the steps of assessing a current situation, deciding on a desired end-state, and finding ways of transforming the current into the desired state. At the end of this process, the final step involves evaluating how well the desired state was achieved. The Rubik's cube shown in Figure 7.7 provides an example of these stages of problem-solving. You begin by looking at the random configuration of the cube (shown on the left), and then switch the layers around until each side of the cube has the same colour. At that point, you will know you have successfully solved the problem.

FIGURE 7.7

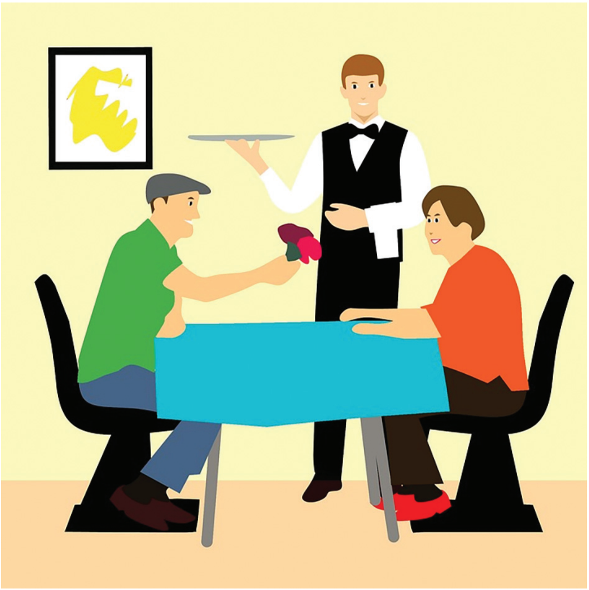
Problem-Solving Steps as Illustrated by the Rubik's Cube

Photo Credit: Popartic/Shutterstock.com; christianchan/123RF; Pedro Campos/123RF

The Rubik's cube provides a well-defined problem in which the solver must transform the randomly arranged cube into six sides that all have the same colour.

FIGURE 7.8

Example of Problem Without Clear Solution



Some everyday problems do not have a clear end state, as shown here when the person offering the flowers must decide on the right moment to propose marriage.

Problems vary tremendously in their structure and complexity. The Rubik's cube is an example of a well-defined problem because it has only one correct solution. Figure 7.8 shows a less well-defined problem whose correct solution may not be so clear. When you're about to give a flower to your romantic partner, you won't necessarily know the "right" words you should use to communicate your feelings until your partner responds. Because this problem has no clear solution, it will require more of your cognitive (and perhaps emotional) resources as you sift through the many possible ways to express yourself.

Advances in technology are providing new areas in which to practise your problem-solving skills. However, these problems often involve heavy cognitive burdens because the correct solutions are not always so clearly laid out for you. You have most likely become quite skilled in figuring out how to add applications to your smartphone or laptop computer without having to rely on any written instructions. However, at some point the problem becomes too complex and you have to turn to website resources after having done an online search. For people accustomed to learning how to use technology by reading instruction manuals that are rarely provided now, you can see what a challenge this can become.

Making matters worse, instructions for new products assume a level of expertise with either the hardware itself or the software you need to install to make it work. Furthermore, you need the hardware itself (i.e., a computer you can connect to the Internet) in order to use that very same hardware.

Complexity and vagueness in instructions are not limited to high-tech areas, though. Cooking recipes often are based on the assumption that you know whether or not to grease a pan before adding dough, what "simmer" means, and whether a piece of meat is truly "brown" or onions are "wilted." Prescription bottles have warning labels that instruct the patient to take the medication with "plenty of water" but also may indicate not to eat or drink before or after taking the medication. The only saving grace in all of this is the more widespread availability of "how-to" videos, but even these require that the user can separate good advice from ads or testimonials that do not actually have the expertise they claim. All of these complications make everyday problem-solving a particular challenge for people not familiar with technology.

Problem-Solving in Adulthood

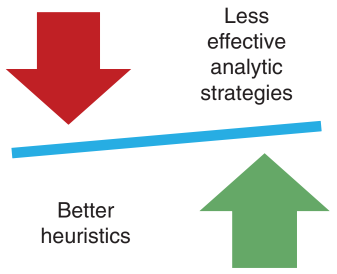
As we have just noted, everyday problems are multidimensional, and the steps in solving them are not always clear. As people get older, they gain in some problem-solving skills at the expense of others. They may become slower and have more memory lapses; however, if they are very familiar with a problem or a type of problem, they can get to a solution more quickly and effectively than can a novice. If you have stood by in awe as your grandmother produced a perfectly formed piecrust in less than two minutes while your own dough sticks limply to the rolling pin, then you can relate to this observation. Indeed, researchers have found that the more extensive experience of older adults can enhance not only their problem-solving performance (Crawford & Channon, 2002) but also their feelings of self-efficacy (Artistico et al., 2003).

Because middle-aged and older adults have acquired expertise through their years of exposure to certain kinds of problems associated with their jobs, hobbies, or daily routines, they have many advantages in everyday problem-solving. They develop the ability to scan quickly for the important factors in a problem and avoid those that are irrelevant. As a result, expert problem solvers avoid information overload by honing in on specific areas that experience has taught them are important to consider particularly in areas relevant to their current life concerns (Artistico et al., 2010). Figure 7.9 summarizes the balance exhibited by older problem solvers between analytics, or taking a problem apart bit by bit, and heuristics, in which older adults use their experience to guide their steps through a problem.

Older adults may also make choices that are better founded and less subject to extraneous factors. One study on decision-making found that, in general, older adults avoid what is known as the “attraction effect.” In tests of the attraction effect, participants must choose from either two (A vs. B) or three (A vs. B vs. C) alternative options. For example, option A may represent a product of medium quality costing $30, while option B is a product of somewhat higher quality costing $40. These two options are about equal in their desirability. Researchers then present a different group of participants with three choices. A and B remain the same, but C is the least desirable of all three ($100 for a product of only slightly higher quality than B). The addition of choice C should have no effect on people’s decision to choose either A or B, but it does. Even though no one would choose C, its presence drives them to be more likely to pick the alternative between A and B that seemed the closest to C (choice B in this example).

FIGURE 7.9

Heuristics Versus Analytics



Problem-solving in later life involves a balance between the less effective analytic strategies an older adult may use, perhaps, balanced against the better heuristics obtained through previous problem-solving experience.

A comparison of older and younger adults in the case of shopping for groceries showed a greater susceptibility of younger adults to demonstrate the attraction effect, meaning that their choices were less rational than those of older adults (Tentori et al., 2001). In a follow-up study (Kim & Hasher, 2005), researchers tested the possibility that older adults were less vulnerable to the attraction effect because they had more experience with grocery shopping. The actions of younger and older adults were compared on an additional task that would be more typical for college students, namely, a choice between options for extra experimental credit. Younger adults showed the attraction effect once again for the grocery shopping case, but not for the experimental credit case. Older adults, though less familiar with the ins and outs of experimental credits, nevertheless did not show the attraction effect in either situation.

These studies are particularly interesting because they relate to behavioural economics, an emerging field that investigates the illogical choices that consumers make in everyday situations. According to the results of the attraction effect study, then, older adults should be wiser consumers, particularly when those decisions have real economic consequences (Lichters et al., 2015).

Increased experience enhances problem-solving in the later years by allowing older adults to sift quickly through information, honing in on what is relevant and arriving at a solution. As we have just seen, this ability to mobilize a familiar strategy can have advantages but can create difficulties in some situations, particularly when it is important to look at possible alternative approaches. For example, an automobile mechanic who goes directly to the distributor as the source of a stalled engine may not notice a more serious wiring flaw elsewhere. Older problem solvers may think that they are doing a better job at solving the problem but, by objective criteria, they may not be considering alternative solutions as effectively as do younger adults and therefore can make an erroneous decision. In a comparison of young, middle-aged, and older adults on ill-defined problems, older adults were found to generate the fewest possible solutions, even when the problems were ones with which their greater experience should have proved helpful (Thornton et al., 2013).

Memory problems can also contribute to difficulties in problem-solving. If you are unable to remember the steps you’ve taken to try to solve a problem, you’ll be more likely to repeat ineffective solutions. This was the pattern of results observed in a study of Japanese monkeys (Kubo et al., 2006). Their task was to find which of nine small openings in a panel contained food. In the experimental condition, the food was hidden behind white plastic plates, so the monkeys had to move the plate to see what was behind it. In the control condition, the food was visible through clear plastic plates. The older monkeys in the experimental condition were hampered in their problem-solving because they went back and checked behind plates they had already moved.

Making up for losses in their strategic planning ability, older problem solvers have the advantage of more experience and more access to information that could help them in a larger variety of situations. As we have already pointed out, people with experience have well-organized storehouses of knowledge that they can easily access and put to use. You may have an older relative who likes to travel abroad and can quickly tell you the pros and cons of a trip you are planning to a foreign country that you have never visited. After years of travelling internationally, this sage advisor can give you knowledge about the country's hotels, places of interest, weather patterns, and the best travel deals. Sports trivia buffs have a similar mastery of large amounts of content matter because they have that knowledge organized into systematic units, such as which of the 31 National Hockey League teams are in the Pacific, Central, Atlantic, and Metropolitan divisions. These are good people to know if you are looking for information, but not good people to challenge in a trivia contest: you will undoubtedly lose.

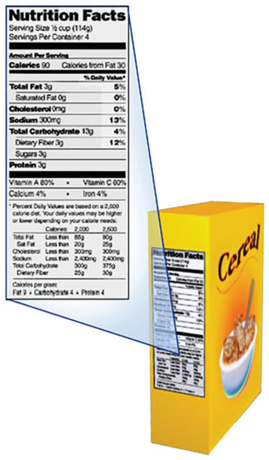
Research on the speed at which adults make decisions confirms that older people are able to reach answers more quickly than younger people who lack either the knowledge or the ability to categorize that knowledge. However, older persons are also more apt to make quicker decisions in areas in which they may not have expertise. Furthermore, they are less likely to seek additional information once their decision has been made. It is possible that rapid problem-solving shown by older adults reflects the fact that their greater experience gives them an advantage in the many areas of decision-making. Therefore, they are not as dependent on incoming information as younger adults. The other possibility is that older adults are less able to organize multiple sources of information, leading their decisions to be based on prior experience rather than on new data related to the problem (Marsiske & Margrett, 2006).

The finding that older adults are faster at solving problems conflicts with the majority of research on adult development and cognition. The types of measures and outcomes used in studies of problem-solving do not always capture timed responses, as is true for studies of psychomotor speed. Rather, studies of problem-solving involve measures based on the amount of information that the participant gathers prior to making a decision, and these measures are not as sensitive to small changes in reaction time.

The most extensive measure of problem-solving ability in daily life is the Everyday Problems Test (EPT), which presents test takers with problems they may encounter in a variety of real-world contexts. You can see an example of the type of item used in the EPT in Figure 7.10. You would answer the questions shown about cereal choices with the information presented in the comparison chart. Performance on the EPT is related to reaction time (Burton et al., 2006), education (Burton et al., 2009), and, among African Americans, health status (Whitfield et al., 2004).

When it comes to making practical decisions in situations with which they are familiar, then, middle-aged and older adults may have an advantage. This possibility was tested in a study on decision-making comparing younger and older adults in a task where a prior choice was either relevant or not to the opportunity to receive future rewards (Worthy et al., 2011). Younger adults earned more points when the best strategy was to select which of two cards per trial would pay off with the higher reward and there was no carryover from trial to trial. Older adults, in contrast, earned more points when the value of the reward on each trial depended on the sequence of choices made on prior trials. These and later findings (Worthy & Maddox, 2012) support the idea that older adults are more likely to base their decisions on the knowledge they develop from prior experience.

As a result of their greater experience and expertise in terms of content and process, older adults may be better able than



	Cereal A	Cereal B	Cereal C	Cereal D
Calories	210	190	100	140
Sodium (mg)	250	0	180	100
Dietary fibre (g)	5	6	5	4
Sugars (g)	12	11	5	3
Total fat (%)	2.0	1.0	0.5	6.0
Price per serving ($)	0.58	0.39	0.26	1.14

EPT-type questions:

1. If you wanted to cut calories, which cereal should you buy?
2. If you need to stick to a budget, which cereal is most affordable?
3. Which cereal would you eat if your physician told you to eat a low-sodium diet?
4. If you wanted to cut down on fats, which cereal would be the unhealthiest?

FIGURE 7.10
Everyday Problems Test

In the Everyday Problem-Solving Test, the individual is presented with information that needs to be used to answer a series of practical questions.

their younger peers to enact the stages of problem-solving in which they appraise the problem, come up with a strategy, and then carry out that strategy. However, when a familiar dilemma appears with a new twist, or when a premature decision leads to avoiding important information, older adults are relatively disadvantaged. Young problem solvers may suffer from their lack of familiarity with many situations, but because they can process larger amounts of information in a shorter time, they may avoid some of the traps of failing to see alternatives that befall their elders.

Adult Learners

The literature on problem-solving in adulthood emphasizes the ability to come to a resolution when dealing with a dilemma. However, the ability to "find" problems seems to be an equally compelling aspect of adult cognition. Research and theory on this aspect of adult cognition was stimulated, in part, by Swiss psychologist Jean Piaget's concept of **formal operations**, the ability of adolescents and adults to use logic and abstract symbols in arriving at solutions to complex problems. Adult developmental researchers have proposed that there is a stage of **postformal operations**, referring to the way that adults structure their thinking over and beyond that of adolescents (Commons et al., 1984; Sinnott, 1989).

Thinking at the postformal operational level incorporates the tendency of the mature individual to use logical processes specifically geared to the complex nature of adult life. The postformal thinker is also able to judge when to use formal logic and when, alternatively, to rely on other and simpler modes of representing problems. For example, you do not need to use the rules of formal logic to unplug a stopped drain. Hands-on methods are generally suitable for dealing with practical situations like this one involving actions in the physical world.

Related to the postformal stage of cognitive development is **dialectical thinking**, which is an interest in and appreciation for debate, arguments, and counter-arguments (Basseches, 1984). Dialectical thinking involves the recognition that often the truth is not "necessarily a given" but that common understandings among people are a negotiated process of give and take. People may not be able to find the ideal solution for many of life's problems, but through the process of sharing their alternative views with each other, most reasonable adults can at least come to some satisfactory compromises. Although you may not agree with some of your friends who have vastly different political opinions from your own, you have learned to respect their viewpoints, no matter how difficult it may be for you to do so and remain on speaking terms.

On a daily basis, average adults face many ambiguities and uncertainties in dilemmas ranging from how to resolve conflicts with their friends to how to make the best choices for their children's education. Many people actively seek out the opportunity to engage others in dialogue and intellectual engagement. The ability to integrate diverging viewpoints and see the advantages to different points of view may be the key to understanding the way that adults think (Kallio, 2011).

Moral dilemmas present one particularly important implication of these concepts related to postformal logic and dialectical thinking. In what's known as the "Trolley Problem" (see Figure 7.11), you are presented with the very unpleasant choice of a trolley proceeding towards a track junction. If you do nothing, the trolley will run over the five people standing in its way. The only way to save them is to pull the switch lever, which will now result in the death of one person standing on that track. The question is, then, whether you kill the one to save the five and let the five die by taking no action at all. Rather than using logical probabilities as presented to them in this dilemma, it appears that most people instead rely on their own intuition in deciding whether to pull the lever or not (Ryazanov et al., 2018). Logic, then, may only go so far in the actual decisions made by adult problem solvers.

These ideas about adult cognition present interesting implications about adults as thinkers, problem solvers, and, particularly, learners. Narushima et al. (2018) maintained that lifelong learning needs to receive more attention in the discourse around active aging. Their sample of 416 Canadians, aged 60 and older, were divided into three groups: short (4 to 18 months), middle (19 to 48 months), and long (49+) duration of participation in publicly funded, non-formal, and non-credit continuing education programs. Results indicated an association between continuous participation in lifelong learning and psychological well-being, even after controlling for vulnerabilities, defined as a composite score of age, health, socioeconomic status, and social support indicators. One important implication of this is that lifelong education is an effective compensatory strategy as

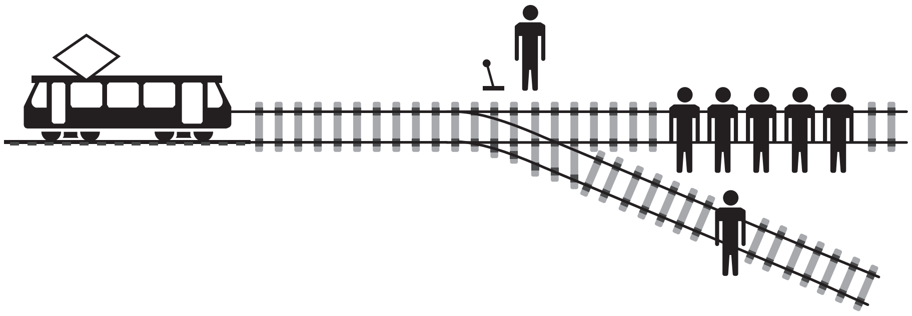


FIGURE 7.11

The Trolley Problem as an Example of Postformal Logic

The Trolley Problem can be seen as a test of postformal logic because there is no "right" answer in deciding whether to pull the switch to save the five and kill the one or do nothing and the five will be hit by the trolley.

older adults experience cumulative vulnerabilities, exerting a protective effect on well-being.

Adult learners are increasingly becoming part of the higher education system. Many Canadian universities are part of the Age-Friendly University (AFU) Global Network, an organization devoted to providing social, personal, and economic benefits to students of all ages and to institutions around the world. The AFU Global Network encourages older adults to be involved in the core activities of universities, such as education and research, but also in health and wellness programs, cultural and arts activities, and intergenerational learning. In addition, interest groups across Canada, such as the Calgary Association of Lifelong Learners (CALL), are comprised of people who "want to engage in learning for the joy of it and to share their knowledge, ideas, and experiences with others" (CALL, 2020). With over 1,100 members, they offer a variety of interest groups, lecture series, and CALL Cafés that cover a broad range of interests and activities.

In the classroom, adult learners may attain mastery of the material through using strategies such as taking more copious notes and relying on them more heavily as they are trying to acquire new information (Delgoulet & Marquie, 2002). The adult learner is also more likely to challenge the instructor to go beyond the information and explore alternative dimensions. Such tendencies, though fascinating in the classroom, can lead to problems when it comes to evaluation. For a person who can see all the alternative angles to a standard multiple-choice exam question, it can be very difficult to arrive at the correct answer because more than one has virtues that merit attention. The adult thinker and learner may find it as fascinating to ponder ambiguities as to settle on one choice, even though only one choice is graded as correct.

The preference that many adult learners have for applying their real-world experiences to what they gain from the classroom suggests that instructors should incorporate problem-centred teaching as much as possible (Papa & Papa, 2011). Flexible models of instruction that allow learners to apply what they are learning to their own lives through active decision-making can also fit well with the learning style of non-traditional adult students (Cornelius et al., 2011). Online courses with opportunities for personalization seem particularly well suited to the style preferred by the adult learner (Ausburn, 2004).

Educators must also adapt their methods of instruction to accommodate the learning styles and preferences of adult students at different levels of ability and literacy. For example, in the case of second-language learning, students with low literacy skills and less prior education in their home country behave differently in the classroom from students who already have more classroom experience. They are less likely to ask for help and participate in classroom interactions. To reach these students, instructors may adopt methods such as asking the students with more education and classroom experience to mentor them, starting with oral exercises before moving to written exercises, and encouraging them to use language in new ways (Ramírez-Esparza et al., 2012). Furthermore, the needs of these adult learners may involve broader issues relating to socialization, ideology, and pedagogical preferences (Mori, 2014).

INTELLIGENCE

If you were asked to define the term "intelligence," you would probably guess that it represents the quality of a person's ability to think. In the most general sense, psychology defines **intelligence** as an individual's mental ability. We know that "some people are cleverer than others" (Deary, 2012, p. 454); the question is why, and how this cleverness changes over adulthood.

The existence of age effects on intelligence in adulthood has many practical and theoretical ramifications. For practical reasons, it is important to find out the relative strengths and weaknesses of younger versus older workers. As we noted earlier in our discussion of problem-solving, there appear to be fairly distinct differences in the styles that adults of different ages use when making decisions. Employers in the public and private sectors can put to practical use the data that psychologists produce from studies using standard intelligence test scores. From a theoretical standpoint, research on intelligence in adulthood has provided new perspectives on the components of thought. This research has also provided insight into the perennial question of how mental processes are affected by "nature versus nurture," as researchers have continued to exploit and explore the application of complex research designs to data on intelligence test scores in adulthood.

Just as physical abilities partially define a person's identity, intelligence serves as an attribute of the person that forms part of the sense of self. People have a good idea of whether they are "smart" or "not as bright," a self-attribution that they can carry for years (Leonardelli et al., 2003). Your theory about your own intelligence can even affect how much you study, although just as important, an influence on your study habits may be how much you think you can control your school performance (Bodill & Roberts, 2013). In either case, as you get older your views about your intelligence may change as you come to adopt some of society's negative stereotypes about aging and mental abilities. Fortunately, the results of research on intelligence provide considerable encouragement about how you can maintain those skills.

The earliest findings on adult intelligence proposed that age differences across adulthood followed the **classic aging pattern** of an inverted U-shape, with a peak in early adulthood followed by steady decline (Botwinick, 1977). Results from the Wechsler scales, which supported the view that intelligence generally erodes over successive decades in adulthood, contrasted a smaller but uniform body of evidence from longitudinal studies. When samples of adults were followed through repeated testings using the Wechsler scales or other standardized tests, the finding was either no decline or a decline that did not become apparent until very late in life.

Theories of intelligence differ in the number and nature of abilities proposed to exist. However, many adult development and aging researchers believe that there are two main categories of mental abilities corresponding roughly to verbal and non-verbal intelligence.

Theoretical Perspectives on Adult Intelligence

The earliest theory of intelligence, put forward by British psychologist and statistician Charles Spearman (1904, 1927), proposed the existence of **g** or **general factor**, defined as the ability to infer and apply relationships on the basis of experience. According to Spearman, g could not be directly observed, but could be estimated through tests that tap into specific mental abilities. Psychologists now find it more useful to divide intelligence into a set of multiple components. Raymond B. Cattell and John L. Horn proposed **fluid-crystallized theory (Gf-Gc)**, the view that intelligence should be divided into two distinct factors (Cattell, 1963; Horn & Cattell, 1966). **Fluid reasoning (Gf)** is the individual's innate ability to carry out higher-level cognitive operations (Cattell, 1971). Originally called **crystallized intelligence, comprehension knowledge (Gc)** represents the acquisition of specific skills and information that people gain as a result of their exposure to the language, knowledge, and conventions of their culture. These broad abilities each reflect distinct abilities that are measured by specific tests.

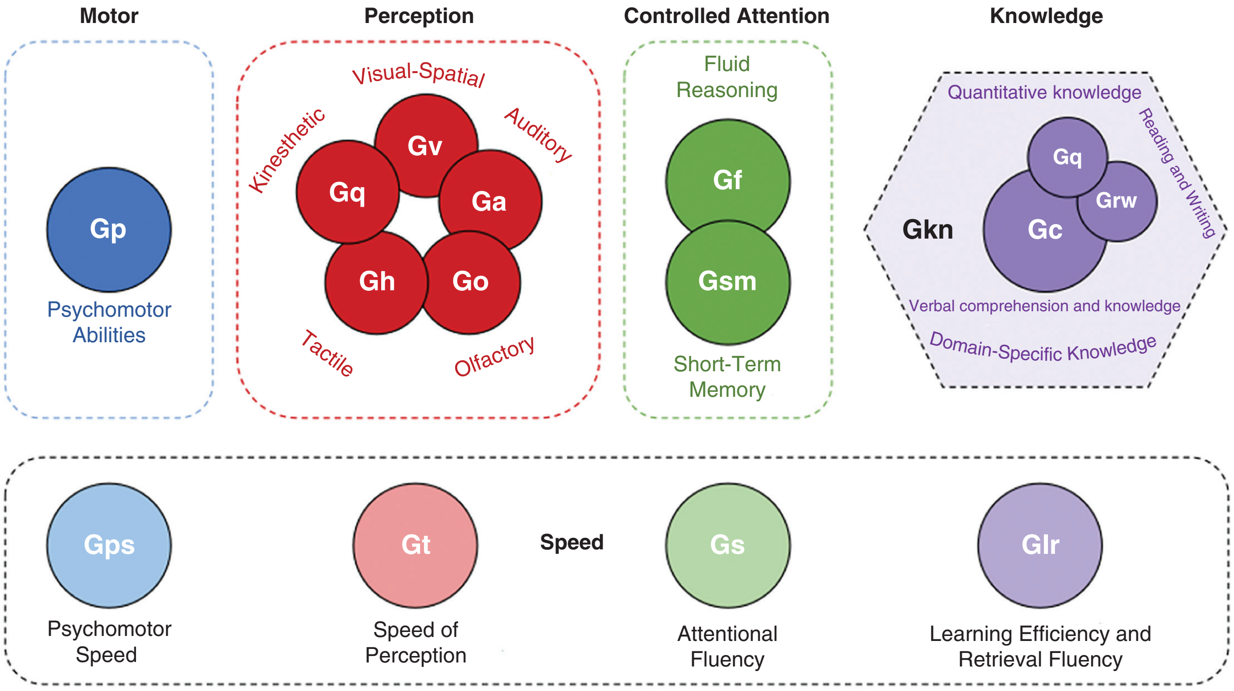
In addition to these two factors, the "extended" Gf-Gc theory proposes that there are eight other broad factors that incorporate cognitive skills such as memory, speed, sensory processing, reading, writing, and mathematical knowledge. Each of these broad factors is measured by a specific test or tests that tap narrower, related abilities. In the extended Gf-Gc model, each broad ability has its own predictive power rather than each reflecting different aspects of g.

Although Cattell and Horn regarded Gf and Gc as being distinct factors, his own analysis of the available studies at the time led educational psychologist John B. Carroll to propose that intelligence is organized into a three-level structure (Carroll, 1993). Combining these theories, the **Cattell–Horn–Carroll (CHC) model of intelligence** proposes that there is a three-tiered structure to intelligence. Figure 7.12 outlines the CHC model. As shown in this figure, there are five broad areas of intelligence (motor, perception, controlled attention, knowledge, and speed). Within each area, the specific abilities are represented by "Gs," whose definitions appear in the accompanying labels (e.g., "Gh" represents tactile intelligence, a component of perception).

In keeping with the CHC's proposed specific abilities, researchers testing the model use tests that measure those abilities such as WAIS-IV scales. The "Knowledge" domain, for example, can be tested with WAIS-IV verbal abilities scales. The advantage of using existing tests for assessing CHC intelligence is that the findings from previous studies can be fit into that larger model. In support of the CHC model, Benson and colleagues (2010) showed the existence of considerable overlap between the WAIS-IV and the CHC model among a sample of participants ages 16 to 90.

FIGURE 7.12

Cattell– Horn– Carroll (CHC) Model of Intelligence


Motor
Perception
Controlled Attention
Knowledge
Gp
Psychomotor Abilities
Visual-Spatial
Kinesthetic
Auditory
Gv
Gq
Ga
Gh
Go
Tactile
Olfactory
Fluid Reasoning
Gf
Gsm
Short-Term Memory
Quantitative knowledge
Reading and Writing
Gq
Grw
Gkn
Gc
Verbal comprehension and knowledge
Domain-Specific Knowledge
Gps
Psychomotor Speed
Gt
Speed of Perception
Speed
Gs
Attentional Fluency
Glr
Learning Efficiency and Retrieval Fluency

The Cattell–Horn–Carroll model of intelligence categorizes five major domains of abilities, each of which is indexed by a specific "G," or skill.

Research on Adult Intelligence

What happens to intelligence as you get older? This seemingly simple question is hotly debated in the literature on adult development and aging. Some researchers claim that intelligence starts to dip as early as the 20s; others are convinced by their data that the changes only become noticeable after the decade of the 60s.

The most comprehensive study of adult intelligence was conducted by K. Warner Schaie. Begun in the 1950s, what is now known as the Seattle Longitudinal Study (SLS) has produced extensive information about what happens to people's intellectual skills as they age. In addition to providing a picture of how age alters intelligence, the SLS has also provided important evidence about how cohort and time of measurement influence patterns of performance on basic intellectual abilities. Additionally, more recent offshoots of the SLS have explored the relationship of intelligence to personality, lifestyle, and the activity of various brain structures as well as patterns of intellectual development across generations.

When he began the SLS, Schaie's intention was to conduct a one-time cross-sectional study in which he would compare 500 people divided into 10 five-year age intervals or cohorts in their performance on the PMAT. His participants were drawn from the insured members of a prepaid medical plan. Schaie decided to expand on the study several years later, when he instituted a series of follow-ups that he then went on to conduct every seven years. As a result of adopting this method, Schaie was able to analyze the data in a series of sequential studies. This made it possible for him to test the effects of age as distinct from time of measurement and cohort. Schaie's foresight in planning a study that would allow analyses using the sophisticated developmental research designs described in Chapter 3 has provided a wealth of information on intelligence in adulthood and the factors that affect its fluctuations.

The first set of findings the SLS produced was based on the cross-sectional analyses comparing all 10 cohorts on the PMAT at one point in time. Replicating the classic aging pattern, the scores of the older adults were lower than those of the younger adults. It was not until seven years later that Schaie was able to show that the classic aging pattern reflected not the effect of age changes, but the combined effects of age, cohort, and time of measurement. For most abilities, even the oldest age group increased or showed no change between the first and second testings. The stage was set for what has now become a 40-year-plus exploration of the factors accounting for why people change, or not, across the adult years.

The findings that Schaie and Zanjani (2006) published in a comprehensive review showed distinct patterns of age changes across the primary abilities. Vocabulary, a measure of Gc, showed the least amount of change, holding up fairly steadily until the age of 74. The largest drop in scores occurred on Numeric Ability, which in the CHC model represents Gq (quantitative knowledge). Supporting these findings are analyses from the University of Manchester Longitudinal Study, conducted over a 20-year period on over 6,000 middle-aged and older adults (Ghisletta et al., 2012). In this study, tests measuring Gf declined at a faster rate than did those of Gc. However, confirming findings from the SLS, there were large individual differences, particularly during the midlife years.

Even in the face of the compelling nature of the SLS findings, Salthouse (2009) concluded from his own analysis of cross-sectional data that the "decline" occurs in intelligence starting at age 20. Schaie (2009), arguing that cross-sectional data cannot prove or disprove the existence of age changes, regards this assertion as unfounded. Moreover, challenging Salthouse's treatment of intelligence as a unitary quality, Schaie along with others maintains that not only do people vary from each other in the rate and extent of change (inter-individual change) but also within themselves and their own abilities (intra-individual change) (Nilsson et al., 2009). Indeed, in an unusual "retrodiction" paradigm using a Scottish sample followed from ages 11 to 77, reading ability measured as correct word pronunciations was found to predict, retrospectively, intelligence scores the individuals had received at age 11 (Deary & Brett, 2015). Thus, even as intelligence may change over the course of adulthood, it does so in a way that reflects individual differences far earlier in life.

In an analysis specifically investigating differences between earlier- and later-born cohorts in the SLS data, a team headed by Gerstorf (2011) showed that some abilities seem particularly sensitive to cohort effects. The later-born cohort had higher scores throughout the entire age range on all abilities except number. Moreover, the earlier cohort also had lower rates of decline.

Why would there be such powerful cohort influences on the rates of cognitive change in later adulthood? Gerstorf et al. (2011) controlled for such possible contributors as years of education and disease (cardiovascular and cancer). The remaining effects may be due to differences in the quality of education (i.e., discovery vs. rote learning), exposure to technology, the increasing complexity of work environments, and changes in gender roles associated with greater labour force participation among women. The authors concluded, essentially, that their findings support the common belief now that "60 is the new 40," or at least "the new 50."

A host of other health and lifestyle factors can affect intelligence test scores across adulthood (see Figure 7.13). As we saw in Chapter 3, retrospective studies show that people close to death show diminished intellectual functioning. Findings from the SLS suggest that health status is indeed related to intelligence test performance. Arthritis, cancer, and osteoporosis are health conditions associated with intelligence test scores (Schaie, 1996), as is metabolic syndrome (Akbaraly et al., 2009). These effects are not limited to Western countries; similar findings were reported among a study of more than 3,200 Chinese aged 60 and older, even after controlling for age, smoking, hypertension, and diabetes (Liu et al., 2009).

Taking advantage of the types of healthy behaviours we discussed in Chapter 5 also seems to help preserve "executive function," or the ability to allocate cognitive resources. The Whitehall II study showed greater declines in this type of intellectual ability among those in the sample who smoked, abstained entirely from alcohol, did not participate in exercise,

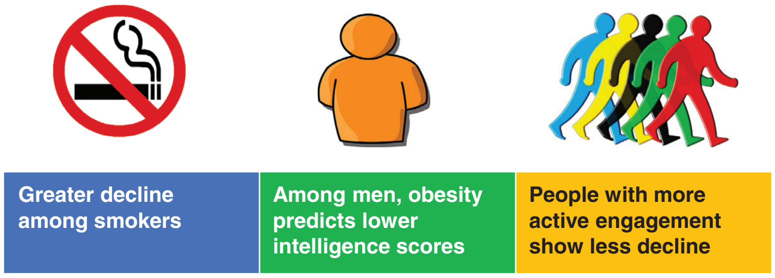

Greater decline among smokers
Among men, obesity predicts lower intelligence scores
People with more active engagement show less decline

FIGURE 7.13

Factors Affecting Aging of Intelligence

These three health-related factors can affect the rate of aging of intelligence in adulthood.

and consumed low amounts of fruits and vegetables (Sabia et al., 2009). Not surprisingly, these were also the individuals who showed the largest increase in BMI over adulthood.

Lifestyle choices also play a role in helping to preserve intellectual functioning in later life. A four-year follow-up study of nearly 32,000 European older adults showed a protective role of social network involvement on tests of memory and semantic fluency, two indicators of intelligence. Additionally, cognitive functioning in these individuals was positively affected by engagement in diversified leisure activities (Miceli et al., 2019).

Having a stimulating job may also benefit an individual's intellectual performance in later life. A study in the Netherlands comparing teachers with non-teachers showed that teachers were technically "younger" on measures of verbal fluency and working memory (Van der Elst et al., 2012). Carrying this notion forward, as shown in the SLS, being exposed to a stimulating environment after retirement can also help individuals maintain their intellectual abilities (Schaie et al., 2001). Exercise training can also benefit intelligence by promoting brain plasticity (Eggermont et al., 2009).

Expertise may also play a role in preserving an individual's intellectual abilities. An intriguing study of players of the Chinese game "Go" revealed that among those with high levels of expertise, the expected decline in memory-based measures of fluid intelligence was not observed (Masunaga & Horn, 2001).

There is increasing evidence showing that these factors affect intelligence test scores through their impact on brain health. Activation of the prefrontal cortex seems to play a role in fluid intelligence among both older and younger adults even when memory performance is controlled (Waiter et al., 2010). Aging individuals showing greater variation in reaction time have lower scores on episodic memory and crystallized intelligence, as well as steeper declines over time (Grand et al., 2016). This finding supports earlier work showing that older adults with lower fluid intelligence show greater fluctuations in their scores over time (Ram et al., 2005). Perhaps these older individuals are more vulnerable to the physiological changes that can exacerbate the aging of the abilities that underlie fluid intelligence. In fact, researchers in the Canadian Study of Health and Aging have observed a predictive effect of low fluid intelligence test scores in a higher rate of mortality in older adults (Hall et al., 2009).

In addition to whatever lifestyle and health factors can affect intelligence across adulthood, personality also plays a role in the maintenance of intellectual abilities. People who score high on measures of anxiety exhibit poorer performance on a variety of fluid and crystallized tests (Wetherell et al., 2002). Conversely, being flexible and open-minded is related to better intellectual performance over time, as revealed in the SLS (Schaie et al., 2004).

The predictive power of personality openness may start to exert its influence very early in life. In a longitudinal study begun on the Aberdeen Scotland Birth Cohort of 1936 when the participants were children, those high in the personality trait of openness to experience had higher scores on measures of reading ability in their mid-60s (Hogan et al., 2012). Similarly, an Australian study on adults ages 74 to 90 found that participants who scored high on one measure of enjoyment of fantasy had higher Gf, Gc, and scores on a measure of everyday functioning (Gregory et al., 2010). However, in both of these studies, personality alone did not serve to predict intellectual functioning. In the Aberdeen study, childhood intelligence was a stronger predictor of cognitive ability in later adulthood than was personality. The Australian study showed that fluid intelligence interacted with personality openness in influencing cognitive abilities. It is possible that people with higher intelligence are higher in personality openness, which in turn affects their cognitive performance in later life.

This latter study raises the problem of cause and effect when examining research on lifestyle and intelligence. Do the intellectually more able seek out more stimulating environments, or does involvement in a rich environment lead to greater preservation of mental abilities? Perhaps older people with high levels of intelligence purposefully search for ways to maximize their abilities. They may also seek out certain complex problems and situations because these fit with their abilities. Research suggests that crystallized intelligence exhibits a stronger relationship to lifestyle than fluid intelligence among older adults who engage in cognitively demanding activities (Dellenbach & Zimprich, 2008). Another possibility is that people with higher intellectual abilities and better problem-solving abilities are better able to take advantage of health maintenance and treatment strategies.

The personality–intelligence conundrum was specifically addressed in another large-scale study of intelligence, the Berlin Aging Study, comparing the two directions of this relationship (Ziegler et al., 2015). According to the "environmental enrichment hypothesis," higher levels of personality openness would lead older adults to better preservation of intelligence. The "environmental success hypothesis," the one you're probably more familiar with, states that people high in intelligence are able to succeed in many arenas in life, allowing them to remain high on openness to experience. Over its 14 years, the Berlin study appeared to support the environmental enrichment hypothesis in that individuals higher in personality openness showed less of a decline in fluid intelligence than their less open counterparts. Crystallized intelligence can also facilitate learning among older individuals. This research lends support to the Openness-Fluid-Crystallized-Intelligence (OFCI), which regards personality openness as a protective factor against cognitive decline in later adulthood (Ziegler et al., 2018).

Further support for the role of the environment as an influence on intelligence comes from studies of aging twins. In the Swedish Twin Study, which followed twin pairs from 41 to 91 years of age, there was evidence of hereditary influences on individual differences in intelligence. However, environmental factors exerted effects on the rate of change over time (Reynolds et al., 2002).

Similar findings were obtained in a study of Danish twins, who were measured using a cohort-sequential design and retested every two years for up to four testings. As with the Swedish study, overall intellectual ability appeared to be a function of genetics, but the rate of change over time was a function of environmental influences (McGue & Christensen, 2002).

Training Studies

Researchers have for decades tried to develop effective intervention strategies to examine ways to counteract the effects of age on intelligence. There is a long tradition within the developmental perspective advocated by Schaie, Baltes, and Willis of seeking ways to help preserve people's functioning as robustly and as for long as possible (Willis & Schaie, 2009).

The underlying theoretical and philosophical perspective for this approach evolved from some of the earliest work in this area by Baltes and Schaie (1976): "Our central argument is one for plasticity of intelligence in adulthood and old age as evidenced by large inter-individual differences, multidirectionality, multidimensionality, the joint significance of ontogenetic and historical change components, and emerging evidence on modifiability via intervention research" (p. 724). To put it more simply, Baltes and Schaie argued for the need to see intelligence as "plastic" or modifiable rather than simply an attribute that declines with age. Much like the debate between the neuronal fallout and plasticity models of aging of the central nervous system, the view of intelligence as "plastic" assumes that declines are not inevitable even though some resources may be sensitive to the effects of aging. The basic assumption that adult intelligence is responsive to interventions was a driving force behind later research, particularly for training studies carried out within the SLS (Willis et al., 2009).

Underlying the plasticity model is the idea that older adults possess **reserve capacity**, abilities that are there to be used but are currently untapped (Staudinger et al., 1995). You can think of reserve capacity as your ability to perform to your highest level when you are positively motivated by a teacher, coach, competitor, or friend. You may not have even imagined that such a strong performance was possible until you completed it successfully. Training studies operate according to the same principle. Tapping into an individual's reserve capacity involves **testing the limits**, the process of continuing to train people until they show no further improvements (Baltes & Kliegl, 1992).

The earliest studies to demonstrate plasticity were conducted in the early 1970s at Penn State University by Baltes, Willis, and their colleagues. These studies demonstrated that, given practice and training in test-taking strategies, older adults could improve their scores on tests of fluid intelligence (Hofland et al., 1980; Plemons et al., 1978; Willis et al., 1981). Keeping in mind that fluid intelligence is theoretically intended to be a "pure" measure of ability, educational experiences should not have had an impact on the scores of older adults. Applying these methods to individuals in the SLS sample, the Penn State group was able to show that training in fluid intelligence tasks such as inductive reasoning could produce gains that lasted for at least seven years (Schaie, 1994).

The most impressive findings on reserve capacity and the possibility for training to improve an older adult's everyday life come from ACTIVE, the large multi-site intervention study we described in Chapter 6. Over the course of the 10-year follow-up, the training groups maintained their superiority over the controls in IADLs. It is most impressive that even a relatively brief intervention could have such a long-term effect, not only in cognitive abilities but also in areas relevant to everyday functioning. Such findings, along with other studies on cognitive plasticity via other intervention methods (Hertzog et al., 2008), provide hope that cognitive training can enable older adults to live independent lives and prevent functional disability.

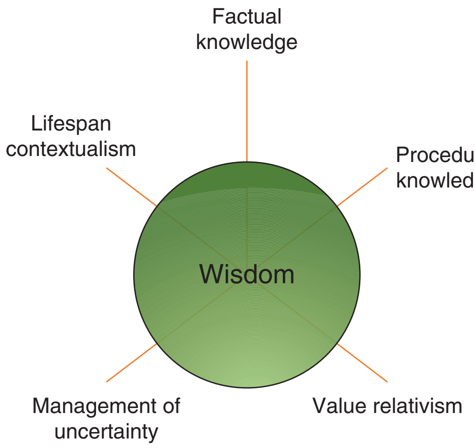
THE PSYCHOLOGY OF WISDOM

Some might argue that the most advanced form of cognition is the capacity for wisdom. Unlike the ability to score well on a traditional intelligence test, wisdom reflects a far less quantifiable phenomenon. If you were asked to define wisdom, you might come up with a meaning that incorporates the individual's knowledge of the ways of the world and understanding of how other people feel, think, and behave. However, you may feel that even this general definition doesn't capture the true meaning of the word as you use it in your own life.

Psychologists who take on the task of defining wisdom actually start by asking lay people what they think it means and, further, to nominate people they think are wise. Baltes and his team of researchers decided to explore this topic after they realized that traditional views of intelligence were focusing only on the **mechanics of intelligence**, which involve cognitive operations such as speed, working memory, and fluid intelligence. He believed that adults become increasingly capable of dealing with higher-level conceptual issues and that conventional tests, by measuring the mechanics of intelligence,

FIGURE 7.14

Berlin Wisdom Paradigm



According to the Berlin Wisdom Paradigm, wisdom incorporates a set of complex cognitive abilities.

fail to capture these abilities. The central element of the Baltes wisdom model proposes that wise people are experts in the **pragmatics of intelligence**, meaning that they can apply their abilities to the solution of real-life problems. According to Baltes, cognitive development in adulthood involves growth in this ability to provide insight into life's many dilemmas, particularly those that are psychosocial or interpersonal.

According to the **Berlin Wisdom Paradigm**, wisdom is a form of expert knowledge in the pragmatics of life (Baltes & Smith, 2008) (see Figure 7.14). For many people, wisdom evolves in the later years of life as they become aware of the role of culture in shaping their lives and personalities (called "life span contextualism"). Wise people become less likely to judge others, and have a greater appreciation for individual differences in values, life experiences, and beliefs (value relativism). People who are wise also have a rich base of factual or declarative knowledge and an extensive background of procedural knowledge, meaning that they know how things work (Baltes et al., 1995). Wise people also have the ability to take other people's perspectives into account (Kunzmann et al., 2018) as well as the ability to recognize and manage uncertainty as a fact of life (Ardelt, 2004).

These conclusions about wisdom developed through studies identifying the characteristics of people nominated by others to be wise who were then asked to comment about another person's personal difficulties. Continued work on the Berlin Wisdom Paradigm has focused on defining wisdom, measuring it, understanding its development, investigating its plasticity, and applying knowledge about wisdom in practical contexts (Staudinger & Gluck, 2011).

In a related attempt to study wisdom, Grossman and colleagues (2010) developed a simulated task in which respondents describe how they would resolve social problems presented to them in the form of stories requiring complex judgements, such as resolving conflicts between different ethnic groups. The researchers then rated their responses along six dimensions, including being able to see multiple points of view, recognizing that knowledge of any situation is limited, making multiple predictions of how the situation may unfold, and trying to resolve the conflict through compromise. A group of professional counsellors and wisdom researchers validated these rating scales. The findings supported the view that, relative to middle-aged and younger adults, older adults are better able to take multiple perspectives, try to forge compromises, and recognize the limitations of knowledge. The same individuals who received higher scores on the wisdom ratings had also received lower scores on a measure of fluid intelligence, supporting the Baltes distinction between pragmatics and mechanics.

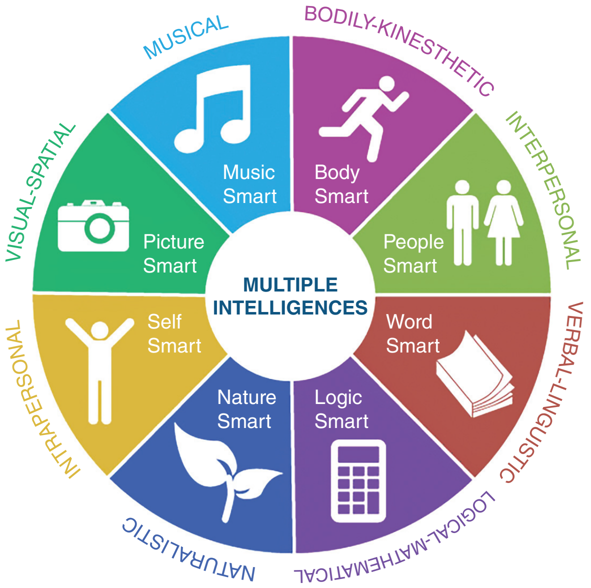
Cultural influences also play a role in the development of wisdom over the adult years. Using the same wisdom scenarios, a subsequent study showed that young and middle-aged Japanese adults had responses that were wiser than those of their American counterparts. For the older adults in the sample, however, the Japanese-American differences were weaker. In fact, older Americans gave responses that were considered wiser than their Japanese counterparts for conflicts involving groups rather than individuals (Grossmann et al., 2012).

Wisdom may also play a role in facilitating the individual's own adjustment to life. Older adults who scored higher on the wisdom ratings using the scenario measure had higher life satisfaction, lower negative affect, less of a tendency to have depressive thoughts, and better social relationships. Five years after participating in the study, the wisest participants also were most likely to still be alive, even after controlling for other factors such as gender, social class, income, perceived health, and verbal abilities (Grossmann et al., 2012). The role of emotions in wisdom is also supported by more recent studies showing how "emodiversity" (a rich and balanced emotional life) can be an important contributor to wiser reasoning (Grossman et al., 2019).

Adding further to the idea that non-cognitive factors can play a role in promoting wisdom is Gardner's **theory of multiple intelligences** (see Figure 7.15). According to this theory, intelligence includes several traditional abilities (logical/mathematical, verbal, visual/spatial) as well as others not usually tapped in intelligence tests (naturalistic, interpersonal, intrapersonal, musical, bodily "kinesthetic," or athleticism). This approach would seem to be an ideal way to capture the complexity of intelligence required for adaptation to daily life. In this sense, wisdom might be seen as most relevant to the domains of interpersonal (knowledge of others) and intrapersonal (knowledge of self), paralleling the distinction between mechanics and pragmatics of intelligence. We might hope that future researchers will explore these alternative and important forms of ability that clearly impact many areas of functioning throughout the adult years.

FIGURE 7.15

Gardner's Theory of Multiple Intelligences



Gardner's theory of multiple intelligences proposes that intelligence is made up of more than abilities tested in standard intelligence tests.

SUMMARY

1. The higher cognitive functions include language, problem-solving ability, and intelligence. Changes in memory contribute in part to age-related losses in language, such as the ability to derive meaning from spoken or written passages, spell, and find words. As a result, older adults use simpler and less specific language. However, many language abilities are maintained, and older adults are able to use non-language cues to help them derive meanings from language. The way that younger persons speak to older adults can also be problematic if this involves elderspeak, which is patronizing and infantilizing speech directed at an older person. The communication predicament describes the negative effects on cognition and language when older people are communicated to in this manner.
2. Throughout the adult years, there is a trade-off in the factors affecting everyday problem-solving between alterations in speed of processing and working memory and gains in experience as individuals encounter a wider variety of problems as well as more depth in their own fields of expertise. However, because experienced problem solvers tend to seek answers to familiar problems by seeking familiar solutions, they may miss something important that is unique to a particular problem. In addition to focusing on one solution rather than considering others, older adults may also tend to stick with one pattern of responding when the situation calls for being able to draw from a range of ideas.
3. There are a number of theories of intelligence, but the majority of research on adult intelligence is based on the fluid-crystallized theory. Studies on the primary mental abilities support the theory's proposal that fluid (unlearned, non-verbal) abilities decrease gradually throughout adulthood. By contrast, the crystallized abilities that are acquired through education and training steadily increase through the 60s and show a decrease only after that point. The CHC theory combines existing theories into one that involves three levels of abilities.
4. The most extensive study of adult intelligence is the SLS, in which sequential methods have been applied to the PMAT. In addition to providing data on age patterns in intelligence test scores, this study has highlighted relationships with intelligence among health, personality, lifestyle, and sociocultural factors.
5. Intervention studies in which older adults are given training in the abilities tapped by intelligence test scores have yielded support for the notion of plasticity. Even five hours of training can result in improved scores across tests for as long as a 10-year period. Following from these training studies, researchers have proposed establishing the reserve capacity of older adults not demonstrated in ordinary life by using a method known as testing the limits.
6. Many older adults turn to the pragmatics of intelligence, or the practical use of knowledge, and away from the mechanics of intelligence, or the skills typically measured on tests of ability. The quality of wisdom in later life develops as individuals become more interested in developing their abilities in the pragmatics of life.

8

Personality

How well can you separate myth from reality about what happens to personality with age? Check your answers on the next page.

AGEFEED

FACT?

MYTH?

1. Personality is set in stone and does not change with age.
2. Aging brings fewer social responsibilities, allowing people to do more of what they want.
3. People become nicer as they get older.
4. Personality change is constant throughout life.
5. Younger adults are better than older adults at controlling their negative emotions.
6. Almost everyone experiences a midlife crisis.
7. Personality traits can predict health in older adults.
8. Pessimists report a higher quality of life.
9. Being in love can reduce neuroticism.
10. Certain personality traits help people live longer.

AGEFEED ...the facts

1. Personality is set in stone and does not change with age.
   Myth! People's personalities change over time, typically for the better.
2. Aging brings fewer social responsibilities, allowing people to do more of what they want.
   Fact! Without the demands of work and raising a family, older adults are often able to pursue their passions and not worry about conforming to social norms.
3. People become nicer as they get older.
   Fact! Adults tend to become nicer and more forgiving with age; however, this is likely because the not so nice adults die at younger ages.
4. Personality change is constant throughout life.
   Fact and Myth! Personality changes most early in adulthood, but people still continue to change after that.
5. Younger adults are better than older adults at controlling their negative emotions.
   Myth! Older adults tend to manage stress by understanding the situation rather than younger adults, who are more apt to take out frustrations on others.
6. Almost everyone experiences a midlife crisis.
   Myth! Believe it or not, there is very little empirical evidence supporting that midlife crises are a certainty.
7. Personality traits can predict health in older adults.
   Fact! For example, extraversion is related to lower blood pressure and neuroticism to higher blood pressure.
8. Pessimists report a higher quality of life because they're less likely to be disappointed.
   Myth! Optimists are less likely to believe in aging stereotypes, which can help maintain a higher quality of life.
9. Being in love can reduce neuroticism.
   Fact! Love may help stabilize personality, which can reduce some of the traits associated with being neurotic such as anxiety and dissatisfaction with life.
10. Certain personality traits help people live longer.
    Fact! Resiliency and adaptability to change are traits found in people who live into their 90s and beyond.

In everyday language, people use the term “personality” to describe a person’s characteristic way of feeling or behaving. For example, you might say that someone does you a favour because that person has a “nice,” “generous,” or “friendly” personality. Although psychologists use a variety of ways to define personality, there is no single consistent meaning that all psychologists use. Instead, psychologists who study personality approach its definition from the vantage point of their particular theoretical preference.

PSYCHODYNAMIC PERSPECTIVE

We begin with the first recognized theory of personality, that of Sigmund Freud. Credited with having “discovered” the unconscious in psychology, his work indeed placed special importance on hidden motives and feelings within the mind. His approach, called the **psychodynamic perspective**, emphasizes the ways in which unconscious motives and impulses express themselves in people’s personalities and behaviour.

Current theories of adult development and personality based on the psychodynamic perspective continue to emphasize such Freudian ideas as the importance of early development and the ways in which people cope with such emotions as fear, anxiety, and love. However, the methods used to study these phenomena are far different than the clinical approach of the traditional Freudians.

Although he left a rich body of work that later theorists would subsequently revise and reshape, many believe that Freud’s legacy in the area of adult development and aging was to make the unfounded claim that personality does not change after early childhood. According to Freud, the major tasks of personality development are completed by the time a child turns five years old. Some changes continue to occur through adolescence, but by early adulthood, the individual’s psychological development is essentially over. As a result, according to this traditional Freudian view, therapy is of little value to individuals over the age of 50, who he believed had personalities so rigidly set that they could not be radically altered.

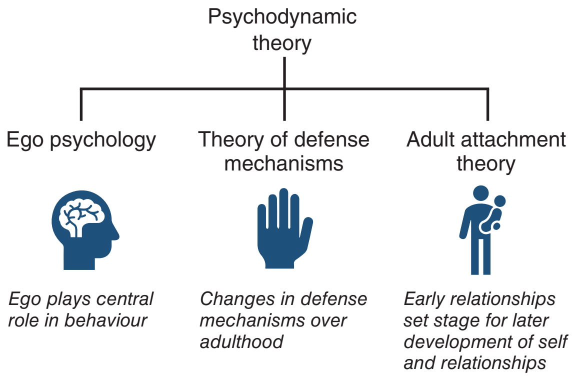
Contemporary followers of traditional Freudian thinking share his emphasis on early development but do not share the pessimistic view that adults are incapable of change. Freudian theory today as applied to adult development is divided into three main branches, as shown in Figure 8.1. This framework will help you keep straight the differences among these three branches, while also seeing how they share a common basis in the psychodynamic perspective.

Ego Psychology

According to Freud’s theory, the mind is made up of three structures that he named id, ego, and superego. As you might recall from your introductory psychology course, the id refers to the individual’s biological instincts, which include the needs for food, sex, and water. Id instincts can also include the need to hurt, kill, and exert power over others. The superego attempts to control the id’s irrational instincts in part through imparting society’s moral standards (the conscience) and in part through providing the individual with an image of goodness to which the individual can aspire (the ideal self).

FIGURE 8.1

Overview of Psychodynamic Theory


Psychodynamic theory
Ego psychology
Theory of defense mechanisms
Adult attachment theory
Ego plays central role in behaviour
Changes in defense mechanisms over adulthood
Early relationships set stage for later development of self and relationships

The tree branches of contemporary psychodynamic theory.

In Freudian theory, the **ego** is the part of the mind that controls rational thought. Its job is to negotiate a way for people to meet their biological needs without putting themselves at risk of violating society’s expectations or falling short of their ideals. Although Freud regarded the ego as acting in the service of the id, other theorists propose that the ego is the central part of the mind and carries out the important function of helping people find a balance between expressing their inner selves while finding ways to adapt to the world’s demands. Psychologists in the area of **ego psychology** believe that the ego plays a central role in actively directing behaviour.

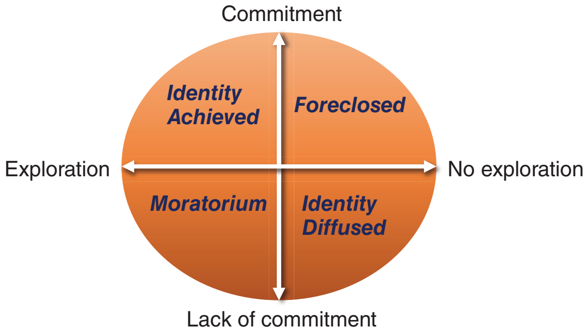
Erikson’s theory of psychosocial development proposes that it is the ego that matures throughout life as the individual faces particular biological, psychological, and social forces. He defined each point in the ego’s development in terms of a push and pull that leads the individual towards a favourable outcome (such as attaining a sense of identity) or an unfavourable outcome (such as not attaining a sense of identity). As each stage is navigated, the individual moves on to the next set of issues following the epigenetic principle, as each stage unfolds in a predetermined order.

Although the theory proposes that particular issues are most likely to arise at particular ages, earlier issues may arise at a later point in life, and the later stages may move to the forefront in earlier periods if conditions develop that stimulate the individual to confront those issues. Research based on Erikson’s theory includes studies that cover a single stage and those that incorporate all or most of the stages. Of all eight stages, identity and generativity receive the greatest attention, particularly among researchers whose work covers adolescence, emerging adulthood, and midlife.

Identity. Erikson’s conception of the stage of identity achievement versus identity (or role) diffusion portrays adolescents as

FIGURE 8.2

The Four Identity Status in Marcia's Theory



In the identity status model, there are four combinations of identity statuses based on the two dimensions of commitment–lack of commitment and exploration–no exploration.

struggling to define themselves in the face of physical changes associated with puberty, cognitive changes, and particularly role changes, where they are expected to find a place for themselves in society.

Starting with this conceptual view, James Marcia (1966) developed the **identity status interview**, which examines the degree of commitment held by the individual to identity issues and the degree of exploration the individual used to arrive at this commitment. Figure 8.2 shows the model used in grouping people into identity statuses. The two dimensions are commitment–no commitment and exploration–no exploration. People who have strong identity commitments and have gone through a period of exploration fall into the identity achieved quadrant. Those with strong identity commitments without exploration are considered foreclosed. Turning now to the two statuses low in commitment, those who are identity diffuse have had no period of exploration and those in moratorium are still in a period of actively exploring alternative identity commitments. The traditional areas within the identity status framework of occupation, religion, and politics have expanded to the areas of racial and gender identity (Graham-Bailey et al., 2018) and acculturation status (Schwartz et al., 2013).

The identity status interview expanded on Erikson's theory by showing that people could have strong identities without going through traditional periods of "crisis" or exploration. For example, they may have taken on the views of their parents in religion, politics, or even of career. Those in moratorium are chronically in crisis, another possibility not considered by Erikson in his twofold distinction.

Marcia's work on the identity statuses has yielded a wealth of research that elaborated on his initial framework, including hundreds of studies that detail the personalities and behavioural profiles of emerging adults in each of the identity statuses (Kroger & Marcia, 2011). For example, people in the identity achievement status tend to be balanced in their thinking, mature in their relationships to others, and thoughtful about their life options. People in the moratorium status tend to be open and curious, on the positive side, but also anxious, depressed, and low in self-esteem. Individuals who are in the foreclosed status appear to be higher in self-esteem but are also closed-minded and rigid. Those who are identity diffuse are more likely to engage in delinquent and drug-related behaviours, as well as having low self-esteem. Within the identity diffuse status, however, there are further distinctions that can be made between the "carefree" diffuse, who do not care about identity issues, and the undifferentiated, who are trying unsuccessfully to arrive at a set of commitments (Schwartz et al., 2011). College-age individuals involved in identity exploration may, at least temporarily, engage in high-risk behaviours involving sex, unsafe driving (Bersamin et al., 2014; Ritchie et al., 2013), and drinking games (Zamboanga et al., 2015).

As is clear from the large body of research based on the identity status model, this approach is a useful one for helping to understand the identity formation process during adolescence and emerging adulthood. However, it is less clear how it can be applied to adults in midlife and beyond. Technically, using the identity status framework, you could be considered "identity achieved" if you went through a period of exploration during your university years or even your early teens. Some 30 years later, would it still be appropriate for you to retain that same set of commitments despite the many opportunities for change that would have ensued since then? Technically, you would be identity achieved, but for all intents and purposes, if you never questioned your identity since adolescence, you would be different from someone who occasionally revisits these important commitments.

The identity process model, by looking at adult development in terms of identity accommodation, identity assimilation, and balance, makes it possible to describe the adult's position on issues relevant to the sense of self at any point in life. People who retain their adolescent commitments without questioning or challenging them, in this framework, are not identity achieved, but instead considered high in identity assimilation (Sneed & Whitbourne, 2003).

Generativity. Midlife adults must also come to terms with issues relating to generativity, according to Erikson's theory. Figure 8.3 shows the four components of generativity as studied in midlife adults. Because Erikson defined generativity as showing care and concern for guiding the next generation, it would follow that parents would be higher in generativity than non-parents. However, not just having children but also successfully parenting them seems more consistent with Erikson's views. Peterson et al. (2006) found that, indeed, parents higher in generativity not only felt closer to their university-age children, but also had children who were happier, more likely to be able to plan for the future, higher in prosocial personality attributes, and higher in social interest, as indicated by their interest in politics, a feature of generative midlife adults as well (Hart et al., 2001). The desire to secure a legacy is another component of generativity, involving a desire to contribute not just to one's family but to the common good (Newton et al., 2019). Grandparenting is another way to express generativity, not only by the fact of having grandchildren, but also by being involved in mentoring, spending time with them, and

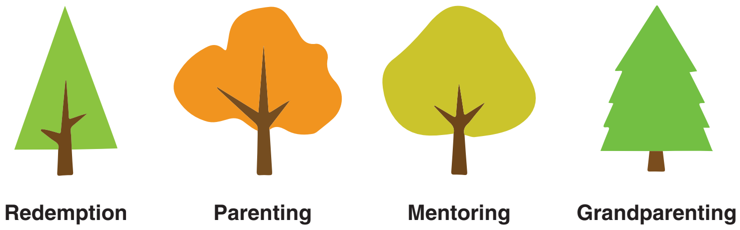


FIGURE 8.3

Expressions of Generativity

Four Ways of Expressing Generativity in Adulthood

strengthening the bonds of mutual family ties (Hebblethwaite & Norris, 2011).

Generativity is not completely selfless, however. According to McAdams (2008), generative behaviours also expand and enrich one's own ego in a process he calls the "redemptive self." By being generative, in other words, you are benefiting your own development as well as the people you are helping. In truly generative behaviour, though, the balance shifts more towards concern about others than concern about your own personal accomplishments. Along the same lines, Bauer (2008) talks about the "noisy ego" versus the "quiet ego." Bauer proposes that people high in generativity have moved past the phase when their "noisy" ego causes them to focus on their own self-interest and can instead have a "quiet" enough ego to allow them to hear what others need and help without thought of or concern for how these actions will benefit them.

Although people high in generativity may be better parents, at least according to some criteria, the idea of the redemptive self suggests that generativity goes beyond even good parenting to extend to concern with the larger society. If this is true, then it seems that people high in generativity should also show greater interest in and concern for helping others beyond their own families, such as participating in volunteer work in their communities; in this regard, generativity shares certain features with altruism (Agostinho & Paço, 2012). Matsuba et al. (2012) found that both college students and midlife adults high in generativity were also more likely to be concerned with environmental issues (which may also be seen as reflecting care for future generations). Similarly, people scoring high in generativity are more likely to believe in, and engage in, environmentally responsible behaviour (Urien & Kilbourne, 2011), a process that may be related to the idea of leaving behind a positive legacy (Zaval et al., 2015).

Overall Psychosocial Development. Researchers also approach the study of Erikson's theory by measuring development along all eight stages simultaneously. In contrast to studies that focus on specific stages, the broad-spectrum approach examines individual differences both in levels of psychosocial development and in the relationships among the stages. According to Erikson, anyone can confront any psychosocial issue at any point in life. Measuring individual differences on all stages at once allows researchers to test this notion.

One of the earliest measures used to investigate psychosocial development across a range of stages was the Inventory of Psychosocial Development (IPD) (Constantinople, 1969), the questionnaire used in the Rochester Adult Longitudinal Study (RALS). The original sample of more than 300 students in the classes of 1965–1968 was followed up in 1977, when they were in their early 30s. At the same time, a new sample of 300 undergraduates entered the study, making it possible to conduct sequential analyses (Whitbourne & Waterman, 1979). Both of these samples participated again in 1988–1989, when the third undergraduate sample was added. At this point, the sample contained three cohorts of college students and two cohorts of adults in their early 30s (Van Manen & Whitbourne, 1997; Whitbourne et al., 1992). The most recent follow-up took place in 2000–2002 (Whitbourne et al., 2009), when the two oldest cohorts were in their 40s and 50s (Sneed et al., 2012).

The latest published follow-up of the RALS used hierarchical linear modelling (HLM), making it possible to look at how individuals changed over time relative to themselves and relative to others in the sample. Previous follow-ups relied on comparing the entire sample's means, obscuring those individual change curves. By using HLM, it was possible not only to see how much change occurred, but also to see who was most likely and who was least likely to change.

One question was whether people who were in a committed relationship right after college would show more or less growth of intimacy in the ensuing decades. As it turned out, those who became involved in marriage or a cohabiting relationship after the age of 31 started out with lower intimacy scores in college. However, over the subsequent two decades, these late-bloomers showed a steeper growth curve than did the individuals who married or cohabited within a few years of college graduation.

Moreover, the individuals in the 1946 Cohort (who were in college in the 1960s) showed a different pattern from those in the 1957 Cohort (in college in the 1970s). Within the 1946 Cohort, those in a relationship by age 31 started out with higher intimacy scores in college than did those not in a relationship. However, those not in relationships by age 31 showed a steeper growth curve and therefore had reached the same intimacy level as their peers by the time they reached their 40s and 50s. These trends also occurred for the younger cohort, but to an even greater degree.

Similar patterns of "catching up" occurred for people who got a later start in their careers. During college, they had low scores on the Eriksonian quality of industry (identifying with a work ethic); however, in the subsequent 20 years, they showed a steeper increase, and eventually caught up with their higher-achieving counterparts. Current work on the 2012–2014 testing of the RALS samples continues to reinforce the conclusion that psychosocial development continues along multiple dimensions across the adult years.

These findings from the RALS show that continued personality development is not only possible but predictable. Even the psychosocial stages associated with childhood showed continued gains for many of the RALS members during adulthood. The RALS data did not, unfortunately, include the kind of rich personal narratives that investigators can obtain when they test their participants in face-to-face interviews. However, the questions that participants answered about their work and family histories provided descriptive information that supplemented the questionnaire scores. By studying the patterns of life changes, the first author extracted enough narrative material to identify five patterns of "life pathways" (Whitbourne, 2010).

The five pathways are shown in Figure 8.4, and as you can see, they represent divergent ways of navigating the course of adult life. Those in the Authentic Road pathway had made a series of changes in their lives, but with each change, sought greater identity clarity and opportunities for growth. The Triumphant Trail pathway included people who did not seek change specifically, but instead were handed significant challenges that they were able to overcome such as death of children, spouses, and partners. It appeared that early childhood, during which these individuals developed favourable resolutions of the first psychosocial issues in life, helped prepare them for those difficult periods in their later years.

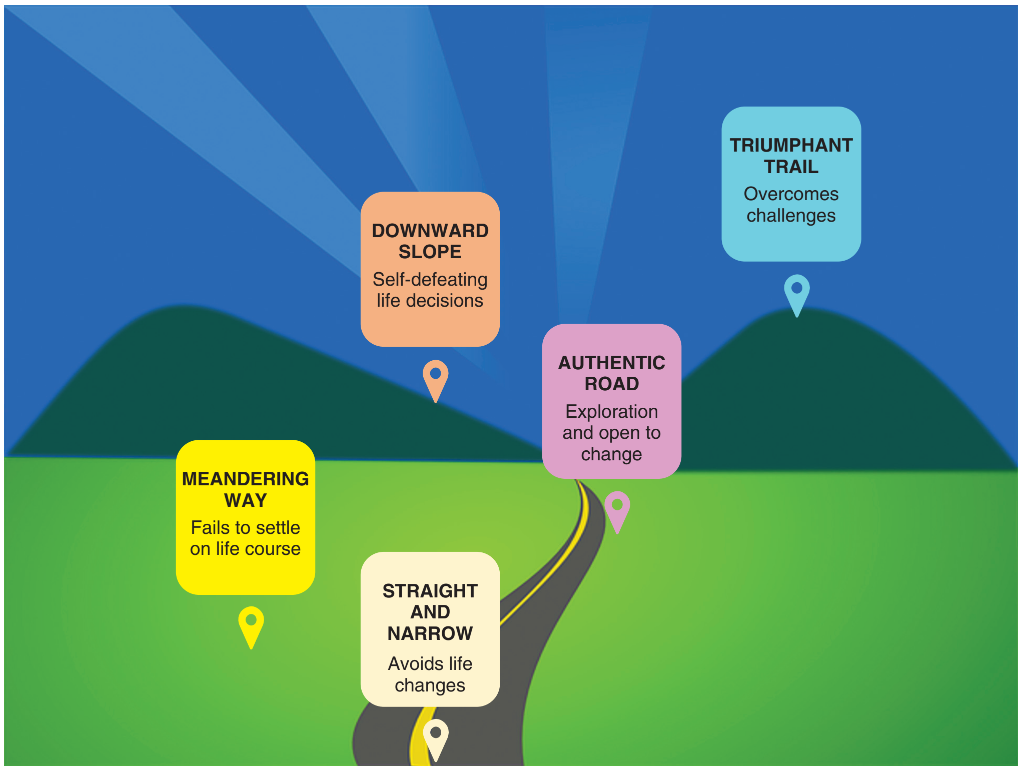
In contrast to the two more positive pathways, the remaining three pathways each reflected a differing pathway marked by less favourable identity resolutions. In the Straight and Narrow pathway were individuals who made virtually no self-initiated life changes but instead maintained highly consistent patterns for decades. In the Meandering Way were people who made a series of very different commitments, but never seemed to settle on one direction to follow. Finally, the people in the Downward Slope pattern made a series of decisions throughout their lives, which set the stage for unfulfilling outcomes such as leaving public service and entering a profitable, but unsatisfying, profession.

There are connections between the pathways and the identity processes of assimilation, accommodation, and balance. In identity assimilation, individuals attempt to maintain a consistent view of themselves over time. Like those on the Straight and Narrow pathway, people who use identity assimilation also fear change and prefer to think of themselves as stable even when situations might require that they change. Identity accommodation is the predominant identity process of those in the Meandering Way because this identity process involves excessively changing in response to experiences when it would be preferable to maintain some consistency. Identity balance is very much like the Authentic Road; people who use identity balance are able to change flexibly in response to experiences but still maintain consistency of their sense of self over time.

A second longitudinal study of college students, this one focusing on women, began in the 1950s to 1960s by Ravenna

FIGURE 8.4

Pathways Model from the Rochester Adult Longitudinal Study



According to the pathways model, there are five differing routes that individuals take through adulthood.

Helson and her colleagues at Mills College, a private school in California. Although not originally intended as a study of Eriksonian development, a number of the findings were interpreted in terms of his theory. The study's founders originally intended to study leadership and creativity among college women (Helson, 1967) but, like the RALS, the study's scope continued to expand to include the years of later adulthood.

The initial findings reported by Helson and her team in the early years presented evidence for considerable personality stability. However, there were several notable exceptions. The Mills women increased in the qualities of assurance, independence, and self-control, and decreased on a scale measuring their perceived femininity. There was also evidence of substantial individual differences in personality change patterns, which the investigators linked to variations in level of ego development and identity. For example, women higher in identity at age 43 were more likely to have achieved higher levels of generativity at age 48 (Vandewater et al., 1997). Similar findings were obtained in a later analysis in which the identity of a woman at age 43 served to predict her well-being at the age of 60 (Helson & Srivastava, 2001). Social roles also influenced the development of women in this sample in such qualities as dominance, masculinity/femininity, flexibility, and achievement (Helson & Soto, 2005). The Mills study findings also support the notion of patterns or pathways throughout adulthood, which suggest consistent variations in well-being are related to a sense of purpose in life (Mitchell & Helson, 2016).

These studies of psychosocial development support the view that personality continues to evolve throughout adulthood but not in a single, universal direction. This conclusion provides an important contrast to studies, which we will examine later, that attempt to relate personality change to age alone rather than to individual variations in life events and personal developmental patterns.

Vaillant's Theory of Defence Mechanisms

The second psychodynamic approach is based on the work of Vaillant (2000), who emphasizes the development of defence mechanisms over the course of adulthood. As we mentioned earlier, intended to help protect the conscious mind from knowing about unconscious desires, defence mechanisms are strategies that people use almost automatically as protection against morally unacceptable urges and desires.

The question, from Vaillant's point of view, is how defence mechanisms change over time, as individuals find themselves presented with new circumstances to which they must adapt ranging from stress at work to problems in their close relationships. This is a very different position from that of Freud, who proposed that there was no personality change of any substance after people reached the age of 50, if not before.

For Vaillant, the major shift that adults experience in their adaptation to life involves using fewer of the so-called "immature" and more of the "intermediate" and eventually "mature" defence mechanisms. You can see these three categories of defence mechanisms in Figure 8.5. Over time, Vaillant proposed that people use increasingly mature and adaptive defences and fewer immature and maladaptive ways of minimizing anxiety. Immature defence mechanisms include acting out and denial.

The immature defence mechanisms involve reacting to a stressful situation in a way that fails to contain your emotions or help you feel better. In denial, you refuse to acknowledge a bad situation, in projection you blame others, in acting out you release your feelings impulsively, and in passive aggression you try to get back at others by finding a way to harm them without being obvious about it.

The intermediate defence mechanisms allow you to turn your anxiety or other negative feelings into slightly more productive outlets. In displacement, you transfer perhaps your angry feelings from your true target to someone who is less threatening, you forget an unpleasant experience in repression, and in reaction formation, you act in a way opposite to your true feelings.

Finally, the mature defence mechanisms allow you to feel better by channelling your anxiety into a constructive activity (such as cooking or gardening), stifle your feelings through suppression, and in anticipation, try to plan ahead so the problem will not seem quite so bad, The other two mature defence mechanisms involve acting to benefit other people in order to feel better (altruism) or using humour to see the funny side of even the worst situations.

In the Vaillant Study of Adult Development (1993), Vaillant and his research team investigated the use of defence mechanisms in three diverse samples of individuals. The first consisted of men in what was known as the Harvard Grant Study. Begun in 1938, this study was intended to characterize the physical and psychological functioning of Harvard undergraduates on a wide variety of measures. Over the course of the subsequent

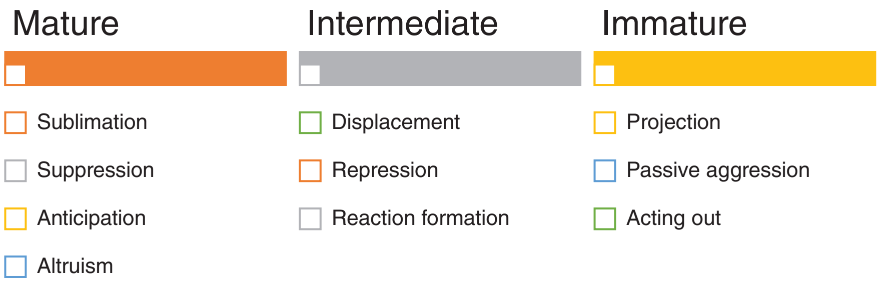


FIGURE 8.5

Defence Mechanisms in Vaillant's Theory

Vaillant's theory of defence mechanisms proposes three categories based on maturity of the defence mechanism used for adapting to stress.

decades, it continued to follow the men as they made their way through the early and middle years of life. Men in the second group, called the Core City sample, were a socioeconomically and racially diverse group chosen as a comparison to the Harvard men. In order to extend the findings beyond men, Vaillant eventually recruited a sample of women from a study originally focused on gifted children. The women in this sample were interviewed again for the purpose of the defence mechanism study when they were in their late 70s.

The initial set of findings provided evidence within each of the three samples for a positive relationship between maturity of defences and various outcome measures. For instance, Core City men who used immature defences (such as acting out) were more likely to experience alcohol problems, unstable marriages, and antisocial behaviour (Soldz & Vaillant, 1998). However, the use of mature defence mechanisms increased over the course of later life up through the oldest age tested of 75 years. Supporting the notion of patterns of development through adulthood, however, there were differing patterns of changes based on the extent to which participants reported having been raised in warm childhood environments (Martin-Joy et al., 2017).

Other longitudinal investigations support the general direction of defence mechanism changes from less to more mature. Cramer (2003) conducted a 24-year longitudinal study in which she followed more than 150 men and women from early to middle adulthood. As in the Vaillant studies, age was associated with the use of more mature defences. In the subsequent 20 years from middle to later adulthood, Cramer and her colleagues found that the maladaptive defence mechanisms used by people with a narcissistic personality (whose gratification depends on the admiration of others) became less psychologically healthy (Cramer & Jones, 2008). Consistently, these studies show that older adults are able to manage their emotions through the use of mature defence mechanisms that involve the control of negative emotions or trying to put the situation into perspective (Diehl et al., 1996; Labouvie-Vief & Medler, 2002).

The general pattern that emerges is that older adults cope with anxiety, stress, or frustration by reacting in less self-destructive or emotional ways than they would have when they were younger. Rather than getting frustrated and giving up on a solution, older adults are more apt to try to understand the situation and figure out a way around it. They can suppress their negative feelings or channel those feelings into productive activities. By contrast, younger people (including adolescents and young adults) are more likely to react to psychologically demanding situations by acting out against others, projecting their anger onto others, or regressing to more primitive forms of behaviour.

These findings from studies of the use of defence mechanisms in adulthood further support the notion that change is possible throughout life. However, they also suggest that people do not change in reliably consistent ways on the basis of age alone. The role of early life predictors, furthermore, is shown in research based on adult attachment theory, to which we turn next.

Adult Attachment Theory

Adult attachment theory proposes that the early bond between the infant and caregiver sets the stage for all of the individual's later significant relationships. Through interactions with their caregivers (usually the mother), infants develop **attachment styles** that are mental representations or frameworks of what to expect in a relationship. These mental representations form models not only of relationships, but also of the self, so they are important for understanding both an individual's personality and close relationships.

According to adult attachment theory, if people feel safe and cared for, they will carry forward into their adult relationships a **secure attachment style** in which they feel confident about themselves and confident that others will treat them well. People who were either abandoned as infants, or felt that they would be, develop an **anxious attachment style** in which they imagine that their adult partners will also abandon them. Being neglected in infancy may also produce adults who show the **avoidant attachment style** with a fear of abandonment so intense that they stay away from close relationships altogether.

There is very little research specifically on aging and adult attachment style in samples, in part because it is seen as a theory about how people choose and relate to romantic partners relatively earlier in adulthood. In fact, we will explore the implications of attachment style for long-term relationship satisfaction in Chapter 9.

Nevertheless, there is reason to examine attachment style as a quality of an individual's personality independently of relationship status. As shown earlier, several investigations of adult personality identify differing trajectories of development in later life as a function, in part, of early influences. Attachment style would clearly fit into this framework as well, relating to a favourable resolution of the Eriksonian stage of trust versus mistrust and to the quality of a warm childhood environment discussed by Vaillant. For example, older adults recalling their childhood in terms of a secure attachment style report being happier on a daily basis than those who report an insecure attachment style (Consedine & Magai, 2003).

Older adults with insecure attachment styles, by contrast, may be more likely to experience social isolation than their securely attached counterparts (Spence et al., 2018). Another risk presented to older adults with insecure attachment style involves health. A subsample of over 3,200 Whitehall II participants ages 50 to 73 provided saliva samples over the course of a day that were analyzed for cortisol levels, an index of stress (Kidd et al., 2013). Additionally, they rated their subjective stress levels. Individuals who fit the criteria of one type of anxious attachment had higher levels of cortisol and perceived stress shortly after awakening, remaining higher than the other attachment groups throughout the day. The group highest in both physiological and psychological stress seemed to spend the day on the watch for signs of rejection by the people closest to them. Understandably, such an approach to one's daily interactions can have cumulatively deleterious effects that take their toll on health.

FIGURE 8.6

Safe Haven Attachment Figures

Pets and other attachment figures can provide “safe havens” for older adults

In attachment theory as applied to later life, a variety of attachment figures can provide “safe havens.”

Older adults, whatever their early attachment styles, may face challenges as they outlive their prior attachment figures (i.e., spouses/partners, siblings, other relatives). Instead, they may turn to a variety of other potential attachment figures or “safe havens” who provide them with emotional security during times of stress (Cicirelli, 2010; see Figure 8.6). Pets provide one such safe haven, because they are with the individual on a daily basis. Others in older adults’ life may serve similar purposes, including clergy, health care professionals, and more distant relatives.

As you can see from this discussion of the psychodynamic approach, there are a number of concepts that can be useful in understanding personality development throughout the adult years. The next approach takes a very different view of adult personality but similarly provides useful perspectives from which adult personality can be examined.

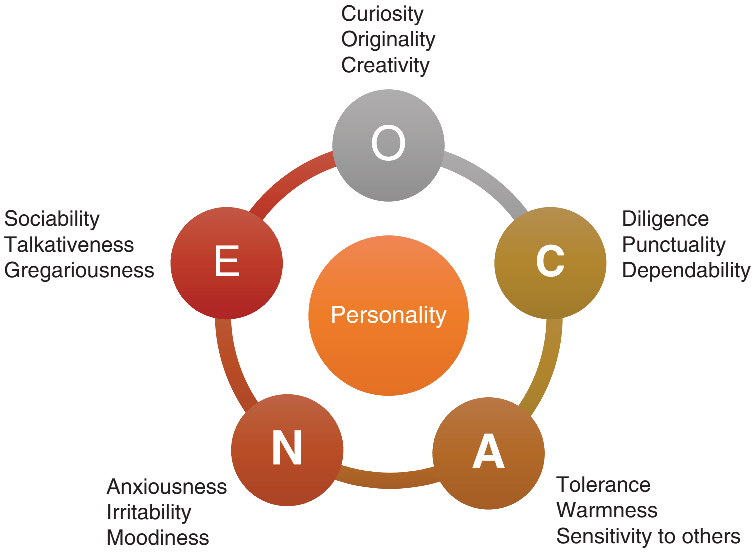
TRAIT APPROACHES

This next approach in personality is based on the concept of **traits**, or stable enduring dispositions that persist over time. When you think about how to describe the personality of a friend, relative, or co-worker, you most likely begin by listing a set of characteristics or qualities that seem to fit the person’s observable behaviour. These characteristics typically take the form of adjectives such as “generous,” or “outgoing,” or perhaps, “quiet” and “unfriendly.” Trait theories of personality propose that adjectives such as these capture the essence of the individual’s psychological makeup.

The **trait perspective** in personality is based on the assumption that the organization of the personal dispositions known as traits guides the individual’s behaviour. Trait theorists view adult development in large part from the perspective of the early psychologist William James (1842–1910) who claimed that personality is “set in plaster” by the age of 30, a position not unlike that of Freud’s. More recently, however, even these views about personality stability are coming under scrutiny, as you will see shortly. The most generally accepted trait theory in the field of personality and aging is based on Costa and McCrae’s proposal that there are five major dimensions to personality (Figure 8.7). The **Five-Factor Model (FFM)** (sometimes called the “Big Five”) is a theory intended to capture all the essential characteristics of personality in a set of five broad dispositions. Each disposition has six subscales or “facets.” To characterize an individual completely requires knowing how that person rates on each of these 30 facets. The tool used to test the FFM is the **Neuroticism-Extraversion-Openness Personality Inventory–Revised (NEO-PI-R)**, a questionnaire containing 240 items measuring the 30 facets (Costa & McCrae, 1992). Clinicians may use the NEO-PI-R to supplement other diagnostic instruments because it provides a measure of personality separate from psychopathology. Researchers use the NEO-PI-R to chart changes in personality over time or to study the relationship between personality and other behaviours, including those relevant to health status.

FIGURE 8.7

Five-Factor Model



The Five-Factor Model, with key indicators of each factor.

The five traits in the FFM are neuroticism, extroversion, openness to experience (or "openness"), agreeableness, and conscientiousness (you can remember these as spelling "OCEAN" or "CANOE"). Each trait name closely fits its meaning in everyday conversation—people high in neuroticism tend to worry a great deal, those who are extroverted are outgoing and sociable, being open to experience means that you are willing to entertain new ideas, having high agreeableness means you get along well with others, and being conscientious means that you attend to detail and tend not to procrastinate.

Within the trait categories, where you stand within the six facets can make a difference in how your personality is reflected in your behaviour. For example, within the extroversion trait, people can be either high or low in the facet of warmth and high or low in the facet of gregariousness. Being high on both would mean you genuinely like to be around people and relate easily to others. Being low on warmth but high on gregariousness would mean that you seek out being with others but that people find it hard to get to know you very well.

Research on Aging and the FFM

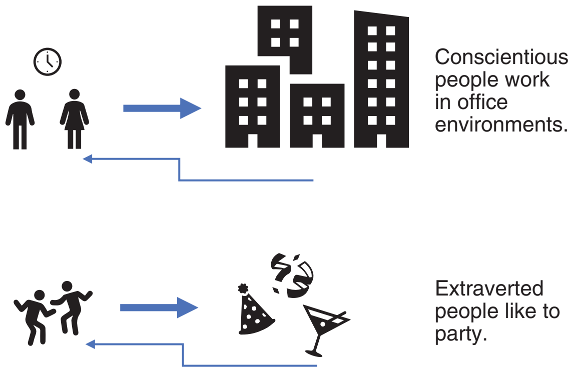
Studies based on the scales of the FFM and aging show a high degree of consistency over time throughout adulthood, with greater consistency among increasingly older groups of adults. However, the consistency between scores obtained at different measurement points becomes smaller the longer the time interval between them (Roberts & DelVecchio, 2000). This means that people maintain their relative positions along the traits in comparison to their age peers; the "highs" stay high and the "lows" stay low. If you had high neuroticism scores as a young adult, you would continue your high levels of worry, anxiety, and general malaise throughout your midlife years and beyond.

Although people may maintain their relative positions along each of the traits, their mean scores may undergo change across adulthood. In a meta-analysis of 92 longitudinal studies, Roberts et al. (2006) reported that individuals increase in social dominance, conscientiousness, emotional stability (the opposite of neuroticism), social vitality (a facet of extroversion), and openness to experience through the age of 40. Social vitality and openness decreased in later adulthood, but agreeableness increased. However, the meta-analysis also showed that four out of the six traits continued to change in middle and later adulthood. Specifically, agreeableness shows steady increases, as does conscientiousness. Emotional stability (the opposite of neuroticism) increases early in adulthood and then remains relatively stable. Openness to experience increases early in life and then remains stable, falling somewhat after the age of 60. Finally, there are increases in a trait called "social dominance," a component of extraversion referring to traits reflecting not dominance but also independence and self-confidence, especially in social contexts. These findings led the authors to conclude that "this meta-analysis clearly contradicts the notion that there is a specific age at which personality traits stop changing" (p. 14). A subsequent longitudinal study spanning the 50 years from ages 16 to 66 further supported the meta-analytic findings, with patterns of maturation evident among from 20 to 60 percent of the sample (Damian et al., 2018). The results of these findings led Roberts and his colleagues to regard the patterns as consistent with the "maturity principle" of adult personality development, which proposes that, for example, individuals become less impulsive as they develop into adulthood.

It is also important to understand how people's personalities influence their life choices, which in turn affect their personalities. According to the **correspondence principle**, people experience particular life events that reflect their personality traits; once these events occur, they further affect people's personalities (Roberts et al., 2013). Figure 8.8 illustrates the correspondence principle. As you can see here, a person high in conscientiousness would be more likely to work in an office environment with its constraints of space and time. That environment will continue to shape conscientiousness in its workers because lateness and slacking off are not rewarded. Conversely, people high in extroversion are more likely to be attracted to social environments, which, in turn, shape them to be even more outgoing. According to this principle, then, personality stability is enhanced by the active choices that people make rather than by any intrinsic likelihood of traits remaining static over time.

FIGURE 8.8

Examples of Correspondence Principle


Conscientious people work in office environments.
Extraverted people like to party.

According to the correspondence principle, people seek environments consistent with their personalities, which further influences their personalities to conform to the environment.

Health and Personality Traits

The idea that personality traits could be related to significant health problems and health-related behaviours originated when researchers discovered what became known as the **Type A behaviour pattern**, a collection of traits that include being highly competitive, impatient, feeling a strong sense of time urgency, and highly achievement-oriented. First identified by cardiologists Meyer Friedman and R. H. Rosenman (1974), the Type A behaviour pattern became known as a major risk factor for heart disease, particularly when people high in the Type A behaviour pattern also have high levels of hostility (Suarez et al., 1991).

Other negative emotions also appear to be important personality traits to add to the equation in predicting heart disease. In one study, researchers followed over 300 healthy men for a 10-year period, measuring their hostility, depression, and anger as well as physiological risk factors for heart disease (Boyle et al., 2007). The men higher in hostility and more prone to experience anger also showed increases in coronary heart disease risk.

Another personality risk factor for heart disease is the so-called **Type D personality** (where "D" stands for "distressed") characterizing people with high levels of anxiety, loneliness, and depression who try to suppress their feelings. People high in Type D qualities have a poor prognosis when they develop heart disease. A common feature underlying their negative emotions appears to be extreme social inhibition, or fear of new situations (Allen et al., 2018).

On the positive side, personality traits associated with favourable qualities appear to play a protective role in heart health, including agreeableness, as shown in a study of over 5,500 Danish adults, ages 49 to 63 (Christensen et al., 2019).

Another favourable personality trait with respect to health is conscientiousness. In a study of nearly 13,000 participants in a large longitudinal study, researchers found that conscientiousness facets of self-control, organization, industriousness, and responsibility were related to lower body fat, healthier metabolic, cardiovascular and inflammatory markers, and better performance on physical assessments. Individuals high in conscientiousness, who are also low in neuroticism and extraversion, are also less likely to smoke, as shown in a meta-analysis involving nearly 80,000 adults spanning nine cohorts (Hakulinen et al., 2015).

Conscientiousness continues to play a role in mortality in later adulthood as well. Among a sample of more than 1,000 Medicare recipients ranging from 65 to 100 years of age followed over a three- to five-year period, conscientiousness, particularly self-discipline (a facet of conscientiousness), predicted lower mortality risk over a three-year period. As the study's authors point out, it is possible that high levels of self-discipline relate to a greater tendency to be proactive in engaging in behaviours that are protective of health and to avoid those behaviours that are damaging to health (Weiss & Costa, 2005). Conscientiousness may exert its positive effect on health through its link with prevention-related behaviours. Lodi-Smith et al. (2010) used structural equation modelling to analyze the relationships among conscientiousness as rated by the participant and someone close to the participant ("observer-rated"), and self-reported engagement in preventive and risky health-related behaviours, education, and self-reported health. People higher in conscientiousness engaged in more preventive behaviours and fewer high-risk health behaviours (smoking, excessive drinking). Because self-report bias may lead people to rate themselves high in conscientiousness and positive health-related behaviours, the observer ratings were an important data source in this study. In fact, people high in observer-rated conscientiousness actually did engage in fewer risky health-related behaviours.

The favourable effects of high conscientiousness on health may also be traced to lower neuroendocrine and inflammatory responses. A longitudinal study conducted in England on over 2,300 adults showed lower stress levels as measured in hair cortisol concentration among individuals higher in conscientiousness, even after adjusting for health behaviour and demographic factors. These findings suggest that conscientiousness plays a direct role in heart health through its relationship to stress (Steptoe et al., 2017).

Researchers are also gaining insight into the relationship between personality traits and cognitive functioning. In a study of over 90,000 individuals across 10 cohorts, Sutin et al. (2019) reported that, independent of age, gender, and education, individuals with lower neuroticism and higher extraversion, openness, and conscientious have higher verbal fluency scores. In part, this relationship may reflect the impact of cognitive functioning on personality changes in middle and later adulthood (Wettstein et al., 2017).

Clearly, personality factors are integral aspects of the biopsychosocial model of development in adulthood and old age. Traits and behaviour patterns that have their origins in inherited predispositions or through early life experiences influence the health of the individual through a variety of direct and indirect pathways. However, although personality traits may be an inherent part of "who" you are, they can modulate and change over adulthood even as they influence some of the most basic components of your ability to remain healthy.

SOCIAL COGNITIVE APPROACHES

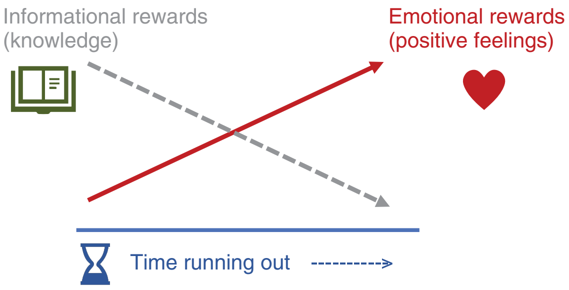
Personality psychologists, as you have just seen, place a significant focus on individual differences in such qualities as defence mechanisms, the structure of personality, and traits. Social cognitive approaches to personality and aging focus on how people's emotions and motivations change over time and how these changes affect the way they see themselves and other people. Researchers in the social cognitive tradition who study aging and emotions are also gaining an increased appreciation for the ways that older adults are able to focus their attention on the positive, rather than negative, aspects of their daily lives. Research on motivation and aging helps provide insight into people's goals, desires, and needs and how they change through life.

The desire to experience positive emotions forms the basis of **socioemotional selectivity theory (SST)**, the view that people seek to maximize the positive emotions they experience in their relationships. SST is based on the premise that there are two types of rewards that relationships can provide. Informational rewards are those that give you new knowledge and emotional rewards give you positive feelings. As shown in Figure 8.9, as people perceive their time to be running out (as happens when people get older), emotional rewards gain in importance compared to informational rewards.

To understand the nature of informational rewards, consider how you felt when you began college. You probably sought out

FIGURE 8.9

Socioemotional Selectivity Theory


Informational rewards (knowledge)
Emotional rewards (positive feelings)
Time running out --------->

Socioemotional selectivity theory proposes that the perception of time running out leads individuals to seek to maximize emotional rewards in relationships and minimize informational rewards.

the people who seemed to know the most about how to get started, and who could also guide you to the places you needed to find. In emotional rewards, you seek out people who help you feel good about yourself and your life. These are the people you turn to when you're feeling lonely, depressed, or stressed in hopes that they will make you feel better. In psychological terms, we would say that through this process you are engaging in **affect regulation**, or increasing your feelings of happiness and well-being.

Endings of any kind, whether the end of life or the end of a chapter in your life, bring out strong emotions and cause you to want to spend time with the people who have been closest to you. Think of times when significant life events have come to an end, such as when you graduated from high school and said goodbye to your classmates. Knowing that you did not have much time left to spend with these people, you wanted to make the most of the time you did have.

Similarly, the desire to maximize emotional rewards leads adults increasingly to prefer spending time with people who are familiar to them rather than seeking out new friends and acquaintances. Family and long-time friends are the people who will serve these positive emotional functions of self-validation and affect regulation. Older adults are less interested in meeting new people and broadening their social horizons than they are with deepening their ties to the people closest to them (Lang & Carstensen, 2002).

A number of studies have examined the propositions of SST and have arrived at varying degrees of support for the theory regarding whether older adults actually do seek to maximize positive affect by regulating their relationships. In one early study, Isaacowitz and colleagues (2006) showed that older adults were more likely than young adults to focus their attention on facial expressions suggesting positive rather than negative emotions. Later research showed, furthermore, that older adults with higher levels of cognitive functioning were particularly likely to show this bias towards positively valenced faces (Isaacowitz et al., 2009).

Even though older adults prefer emotionally positive stimuli, this preference may not be reflected in the way that they feel (Isaacowits, 2012). Furthermore, the positivity effect in viewing happy faces may not translate to non-Western cultures. Research testing SST on a Chinese sample showed older adults to look away from, not towards, happy faces (Fung et al., 2008).

The so-called positivity effect may transfer to memory. According to this view, it is easier to remember words with positive associations than those with negative associations. Testing this approach within the context of SST, Barber et al. (2016) found that when prompted to think about a limited future, both younger and older adults showed better memory for pictures depicting positive than for those having negative content.

A most recent approach to testing SST examines the emotionally laden situations that individuals seek out. It may be one thing to show a preference to look at positive images, or even to remember them, but quite another to understand how people regulate the situations that could affect their emotions. Across a series of five experiments on individuals ranging from young to later adulthood, Livingstone and Isaacowitz (2019) found that the tendency to seek out happy experiences was not unique to older adults. In experimental versus natural settings, this desire to be exposed to positive emotional content may be more universal than SST implies (Isaacowitz et al., 2018).

COGNITIVE PERSPECTIVE

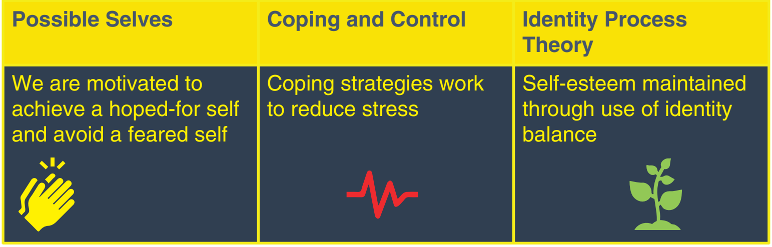
The cognitive perspective views people as driven by the desire to predict and control their experiences. Emerging from this perspective are cognitive self-theories, which propose that people regard events in their lives from the standpoint of how relevant these are to their own sense of self.

Specific theories about aging and personality based on the cognitive perspective place importance on the ways that people interpret their experiences and understand themselves over time. Figure 8.10 summarizes the three main approaches within the cognitive perspective. All focus on thoughts about experiences as the driving force for the ways in which people respond to those experiences.

Possible Selves Theory

The **possible selves** model proposes that the individual's view of the self, or self-schema, guides the choice and pursuit of future endeavours (Markus & Nurius, 1986). The possible self means literally just that: what are you now, and what *could* you be in the future? These thoughts about the self can motivate you to act in certain ways so that you achieve your "hoped-for" possible self, or the person you would like to be. These self-conceptions about the person you will be in the future continue to shift as you develop throughout adulthood. People can remain hopeful of change until well into their later years (Smith & Freund, 2002). Increasingly important as you get older is your health-related possible self, meaning your hope that you will remain in good shape and free of disease (Frazier et al., 2002). A dreaded possible self is the opposite of the hoped-for possible self. With regard to health, most people would rather not become ill and so they will take action to avoid that outcome.

According to possible selves theory, people are motivated to strive for a hoped-for possible self and will attempt to avoid



Possible Selves	Coping and Control	Identity Process Theory
We are motivated to achieve a hoped-for self and avoid a feared self	Coping strategies work to reduce stress	Self-esteem maintained through use of identity balance

FIGURE 8.10

Cognitive Perspective

The three major cognitive approaches to adult personality.

a dreaded or feared possible self. To the extent that they are successful in this process, positive feelings of life satisfaction are theorized to emerge. People think of themselves in a negative light and view their lives negatively when they are unable to realize a hoped-for possible self or to avoid the dreaded possible self. For instance, you probably feel better when your grades confirm your possible self as a good student and you study harder to avoid the dreaded self of a person who fails out of college.

However, people have ways to protect themselves from these negative self-evaluations. One tactic is to revise the possible self to avoid future disappointment and frustration if experiences suggest that the possible self may not be achievable. You may realize that you will not be a straight A student if your grades include a mix of As and Bs (or lower grades), so you revise your possible self accordingly. You will probably feel better about yourself in the long run if you do so even though you may continue to strive for good grades. A similar process seems to be at play for older adults. In one study, those older adults who underestimated their future selves (in both the physical and social domains) had higher well-being a year later than those who overestimated their future selves (Cheng et al., 2009). By lowering their expectations, they evaluated more positively the outcomes they did achieve.

Coping and Control

Adult development researchers are interested in the field of aging and sense of personal control, based in part on a popular belief that adults undergo a loss of the feeling that they control what happens to them as they age. Studies carried out within the National Survey of Midlife Development in the United States (MIDUS) showed that contrary to the popular myth, older adults retain the feeling of being in control of their lives despite being aware of the constraints they may encounter. They do so by viewing their resources and potential positively rather than focusing on losses (Plaut et al., 2003).

The cognitive approach to stress emphasizes the role of perceptions as determining whether or not an event will be viewed as a threat, which, in turn, determines whether it is viewed as stressful. The experience of **stress** occurs when you perceive that the situation overwhelms your ability to manage effectively in that situation. **Coping** refers to the actions people take to reduce stress. There are two main forms of coping. In **problem-focused coping**, people attempt to reduce their stress by changing something about the situation. Conversely, in **emotion-focused coping**, people attempt to reduce their stress by changing the ways they think about the situation. Other methods of coping fall in between these two, such as seeking social support, a coping method that involves both taking action (by talking to other people) and attempting to feel better (which may result from talking to other people). Another way to distinguish between the two types of coping is approach (problem-focused) and avoidance (emotion-focused).

Cognitive theories of coping propose that the most effective coping strategy is one that matches the demands of the situation and its modifiability by actions the individual can take. If the situation is one that cannot be changed, people only become more stressed if they keep trying to use problem-focused coping, particularly as their efforts deplete their coping resources. For situations that can be changed, however, using emotion-focused coping would mean that you fail to take advantage of steps to improve the situation that would cause it to be less of a problem in the future. For example, if you have a number of pressing deadlines, simply wishing they would go away will not be an effective means of coping because by missing the deadlines, you create further problems for yourself.

When you cope successfully with a stressful situation, your mood improves and you have a higher sense of well-being. The process seems to be reciprocal—people who feel better also cope more successfully. One longitudinal investigation of coping in midlife adults followed over a 10-year period found that people who were less depressed are more likely to resolve problematic situations successfully (Lachman et al., 2009).

Some people seem to be characteristically better able to cope with challenging life events. These are the individuals said to be high in **resilience** or the ability to recover from stress. Resilient older adults are able to overcome negative emotions and adapt to new situations as these arise, even if those situations are objectively stressful (Ong et al., 2006). Social support and personality appear to play a role in promoting resilience (Montpetit et al., 2010). Belief in their own coping resources, furthermore, can help older individuals approach stressful situations in a more effective manner (Trouillet et al., 2009). These resilient individuals can take charge of potentially stressful situations before they become problematic, leading to fewer health-related stressful situations (Fiksenbaum et al., 2006). Finally, religion can also serve as an important coping resource for promoting resilience in older adults (Van Ness & Larson, 2002).

Although some discussions of coping in later life regard older adults as passive rather than active copers, it is not necessarily given that as people get older they adopt a fatalistic approach to managing their fortunes or that they become ineffective copers. A study of the victims of the 2005 Hurricane Katrina that devastated New Orleans showed that older and younger adults were equally effective in engaging in coping strategies to manage their responses to the disaster (Cherry et al., 2009).

Identity Process Theory

According to identity process theory, the goal of development is optimal adaptation to the environment through establishing a balance between maintaining consistency of the self (identity assimilation) and changing in response to experiences (identity accommodation). The actions people take upon the environment reflect attempts to express their sense of self by engaging in the activities they regard as important and worthwhile. Through identity assimilation, people interpret events in a way that is consistent with their present identity. If an event occurs that is so discrepant a person cannot interpret it in terms of identity at the moment, identity accommodation comes into play.

Most people have fairly positive views of themselves, but as they get older, more and more experiences occur that can potentially erode self-esteem. However, research on identity processes shows that adults increasingly rely on identity assimilation, and this is how older people are able to maintain positive self-esteem. The edge that assimilation has over accommodation is theorized to be just enough to maintain this positive view without leading individuals into self-views that are so off base as to be completely out of sync with experiences (Pilarska, 2016).

The multiple threshold model, which we described in Chapter 2, predicts that individuals react to specific age-related changes in their physical and psychological functioning in terms of the identity processes. This model was tested in a study of nearly 250 adults ranging in age from 40 to 95 years (Whitbourne & Collins, 1998). Individuals who used identity assimilation with regard to these specific changes (i.e., they did not think about these changes or integrate them into their identities) had higher self-esteem than people who used identity accommodation (i.e., became preoccupied with these changes). A certain amount of denial, or at least minimization, seems to be important with regard to changes in the body and identity.

Later studies have examined the relationship between identity and self-esteem more generally and found self-esteem to be higher in people who use both identity balance and identity assimilation (Sneed & Whitbourne, 2003). Identity accommodation, by contrast, is related to lower levels of self-esteem throughout adulthood. However, men and women differ in their use of identity processes in that women use identity accommodation more than do men (Skultety & Whitbourne, 2004). In addition, some women who use identity assimilation may claim that they use identity balance to appear as though they are flexible and open to negative feedback when in reality, they prefer not to look inward and perhaps confront their flaws (Whitbourne et al., 2002).

That there may be an advantage to identity assimilation in terms of health and mortality is supported by research on self-perceptions of aging and longevity (Levy et al., 2002). Older adults who managed to avoid adopting negative views of aging (which may be seen as a form of identity assimilation) lived 7.5 years longer than those individuals who did not develop a similar resistance to accommodating society's negative views about aging into their identities. Self-perceptions of being ill can further affect the way that individuals view their age, seeing themselves as "older" in a process similar to identity accommodation (Kundrat & Nussbaum, 2003). The advantage of denial over negative self-evaluations associated with aging (a form of identity assimilation) also was demonstrated in a long-term longitudinal investigation in which people who used denial had better psychological health (Cramer & Jones, 2007). Conversely, relying primarily on identity accommodation is associated with the experience of depressive symptoms (Weinberger & Whitbourne, 2010).

The tendency to use identity assimilation when thinking back on your life and how you have changed is a general bias that pervades the way people recall their previous experiences. The **life story** is an individual's inner personal narrative of the past events in his or her life (Whitbourne, 1985). This tendency was demonstrated in one study investigating retrospective reports of personality change in a sample of nearly 260 men and women in their early 60s. Men, in particular, were likely to see themselves as having gained in attributes such as "confident power" between their 20s and 60s (Miner Rubino et al., 2004).

Identity assimilation may also serve a protective function in other contexts in which older adults are faced with potentially negative information about their abilities. One group of researchers used a novel opportunity to study this process among older drivers referred to driver education classes due to a history of auto accidents. Those older drivers who overestimated their driving abilities became less depressed after receiving feedback about their actual driving abilities than older drivers who took a more pessimistic view of whether their driving abilities had changed (De Raedt & Ponjaert-Kristoffersen, 2006).

However, there may be cultural biases in the tendency to use identity assimilation or identity accommodation. A cross-national study comparing Dutch and American older adults showed that maintaining a youthful age identity mediates the link between identity processes and self-esteem. However, this mediation effect was stronger in the Americans than in the Dutch, reflecting cultural differences in views of aging (Westerhof et al., 2012). People in the United States are more likely to be focused on maintaining a youthful identity compared to people living in the Netherlands, which has strictly enforced mandatory retirement at age 65.

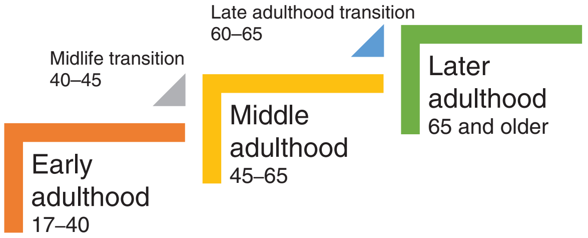
As personality research, with its focus on individual differences, continues to be integrated into studies within the field on topics as diverse as health, cognition, reactions to life events, and physical changes, greater understanding will be gained about how people vary in their reactions to the aging process. Such work will help further the development of the field in terms of biopsychosocial processes, leading to both a richer theoretical understanding of aging and practical implications for intervention.

MIDLIFE CRISIS THEORIES AND FINDINGS

The **midlife crisis** refers to a period of self-scrutiny and re-evaluation of goals triggered by the individual's entry into middle age. Derived from an age-stage approach to personality in adulthood, the midlife crisis had its origins in psychodynamic theory but has spread far beyond its original meaning to become a catch-all term for any changes that people experience between the ages of 30 to 60. In this section of the chapter, we'll examine the evidence pro and con to see whether the midlife crisis deserves its place in the scientific literature, if not in popular lore.

FIGURE 8.11

Stages in Levinson's Theory



Levinson's theory of the midlife crisis is based on the idea that individuals experience transitions from one life structure to another between major periods of life.

Theory of the Midlife Crisis

It is safe to say that most people in contemporary American society are familiar with the term "*midlife crisis*." The topic of the midlife crisis has become a permanent fixture in popular psychology. A recent search of a popular commercial website revealed more than 100 books on the topic, and there is no sign of diminishing interest in the foreseeable future. It may therefore surprise you to learn that the concept is largely discounted in academic psychology.

The term midlife crisis was coined by psychoanalyst Elliot Jaques (1965) in a paper outlining the role of fear of mortality as prompting life crises in well-known historical figures. The term remained relatively obscure until it was picked up by journalist Gail Sheehy (1974), whose popular book *Passages: Predictable Crises of Adult Life* placed it front and centre in the psychological life of 40-something adults. Sheehy's book was based on research being conducted by others, including Yale psychologist Daniel Levinson, who would later publish his own best-seller called *The Seasons of a Man's Life* (Levinson et al., 1978). The Levinson/Sheehy approach emphasizes strict age-based turning points in adulthood, of which the midlife crisis was just one. In his subsequent publication on women, which was greeted with far less attention in the popular press, Levinson claimed that similar alternations between change and stability characterize adult women (Levinson & Levinson, 1996).

Levinson's publication itself was based on interviews with a small sample of 40 men ranging in age from the mid-30s to mid-40s. The men in the sample were intended to represent men from diverse backgrounds, with 10 from each of the following occupations: business executive, academic biologist, blue-collar worker, and novelist. In addition to these interviews, the authors included informal analyses of the biographies of famous men and the stories of men portrayed in literature.

Although the midlife crisis was the common notion to emerge from Levinson's work, his study went beyond age turning points in proposing the changes that occur throughout the midlife years (see Figure 8.11). Levinson proposed that development involves primarily changes in the **life structure**, or the way that the individual's life is patterned at a given point in time. Your life structure includes your involvement in family, work, leisure, friendships, and religion and takes into account your ethnicity. It is influenced by your conscious and unconscious sense of self but also by the social and cultural environment in which you are living.

The idea of the life structure is certainly consistent with other views of development in midlife, including that of the life story and identity process model. What distinguishes Levinson's theory was his proposal that the life structure evolves through an orderly series of universal stages in adulthood. He proposed that these stages alternate between periods of tranquility and periods of transition, with each stage having a specific focus.

Levinson believed that during periods of stability, the man builds his life structure around the decisions he made in the previous stage. If he chose to pursue a certain career path, he continues in that path throughout the period of stability. However, as the period reaches its close, the man becomes driven by both internal and external factors to question his previous set of commitments. For the next four or five years, during the transitional period that ensues, he explores different alternatives and seeks a new life structure or a modification of the existing one. Levinson believed that these transitional periods are inevitable. Choices are always imperfect, and as the outcome of one set of choices plays itself out, the individual begins to experience regrets and a desire for change. As stated by Levinson et al. (p. 200), "no life structure can permit the living out of all aspects of the self."

The period called the midlife transition has a special quality compared to other transitional periods because it involves the most significant shift, from early to middle adulthood. As shown in Figure 8.11, the period of the midlife transition ("crisis") is targeted as 40 to 45. However, its beginning can occur anywhere between 38 and 43, and its ending can occur anywhere between the years of 44 to 47.

The first theme of the midlife crisis is overcoming disillusionment due to failure to achieve the dreams of youth that inevitably cannot be fully realized. The individual must then establish a new set of more realistic aspirations. The second theme of the midlife crisis involves making decisions about how to pursue the life structure during middle adulthood. During this time, the man questions his marriage, comes to grips with the maturing of adolescent children, handles promotions or demotions at work, and reflects on the state of the nation and the world. He may begin to establish mentoring relationships with younger persons so that he may pass along the torch of what was handed to him during his early adulthood. Finally, the man must resolve the polarities of his personality involving masculinity and femininity, feelings about life and death, and the needs for both autonomy and dependence on others.

Although Levinson's theory predicts that the stage sequences are universal, it does allow for variations in progress through the late 30s that would affect the specific nature of the midlife crisis. In the most frequently observed pattern reported in the sample, a man advances steadily through a stable life structure but then encounters some form of failure. Usually, this need not be a catastrophic loss, such as getting fired or facing divorce, but it may be simply a perceived failure to achieve some particular desired goal by a certain age. For instance, he may not have won an award or distinction for which he was striving, such as the biologist who knows he will never win a Nobel Prize. Most people would not be distraught over such a "failure," particularly if they were generally well regarded in their profession or community. However, if this goal is part of an individual's "dream," it can lead to serious disappointment and self-questioning. Some men in the sample did in fact realize their dreams, others failed completely, and still others decided to change their life structures entirely out of boredom.

The characteristics of the midlife crisis are by now well known through their representation in contemporary literature, theatre, movies, and song. For many people, they seem almost synonymous with the particular characteristics of the baby boomers, whom current society regards as being obsessed with aging, determined to stay young, and selfishly concerned with their own pleasure. However, this is not what Levinson believed. He regarded the midlife crisis as a virtually universal process that has characterized human existence for at least 10,000 years.

Critiques and Research on the Midlife Crisis

Apart from the original investigation by Levinson and colleagues, little to no empirical support has been presented for the existence of the midlife crisis as a universal phenomenon (Lachman, 2004). Even before the data were available, however, psychologists in the adult development field expressed considerable skepticism about the concept of the midlife crisis based on what at the time appeared to be extrapolation far beyond the available evidence (Brim, 1976). Figure 8.12 summarizes the three main points of the midlife crisis critiques.

One of the most significant criticisms of the midlife crisis was the fact that Levinson (and Sheehy) relied too heavily on age as a marker of development. As you've already learned, chronological age is not necessarily an accurate indicator of an individual's psychological status or even physical functioning. However, adding to this problem is the fact that Levinson and other midlife crisis writers contradicted each other on exactly when this age was supposed to be. Some said 40 to 45, others 38 to 47, others exactly the age of 43. Because of this lack of clarity, the midlife crisis term can be used for any situation in which a person feels stressed, unhappy, or preoccupied with feelings of failure. We will return to this point shortly.

FIGURE 8.12

Midlife Crisis Critique

1. **Age is not a marker of development.**
2. **Levinson's book was highly subjective.**
3. **The findings were never replicated.**

The criticisms of the midlife crisis theory fall into three basic areas.

The Levinson study itself was also flawed in that the original sample was hardly representative enough to support claims of universality. Of the 40 men that Levinson and his team interviewed, half were from the highly educated and intellectually oriented strata of society. Another one-quarter of the sample consisted of successful business executives. The concerns of the men in this sample, such as running companies, publishing novels, and competing for Nobel Prizes, are hardly those of the average man (or woman).

The scientific basis for the Levinson model can further be criticized because Levinson himself seemed to lack objectivity and his need to understand his personal experiences. He speculated that perhaps the study's results reflected the "unconscious fantasies and anxieties" (p. 26) of himself and his middle-aged male colleagues. Compounding this problem was the fact that the study's investigators never clearly stated their procedures for conducting the ratings of life stages. They did not even publish the interview questions, as would be typical for a study such as this one.

One of the first empirical challenges to the midlife crisis concept actually came from the laboratories of McCrae and Costa, who used their extensive database on personality at the time to test several specific predictions (McCrae & Costa, 2003). The easiest process was to plot the scores on the NEO scales by year across the supposed midlife crisis peak years. However, the scores were essentially flat; in fact, neuroticism was lower by a very small amount in the 43-year-olds.

Having explored this indirect approach, McCrae and Costa created what they called a "Midlife Crisis Scale" and administered it to 350 men ages 30 to 60. Items on this scale asked participants to rate themselves on emotions related to the midlife crisis, such as feelings of meaninglessness, turmoil, and confusion, job and family dissatisfaction, and fear of aging and death. If any questions had detected a midlife crisis, these surely would have. Yet they did not, either on the initial sample or in a different group of 300 men tested with a slightly shorter version (Costa & McCrae, 1978). The most telling data of all, however, emerged in a second study on the Midlife Crisis Scale. The data were from men participating in the Department of

Veterans Affairs Normative Aging Study, one of the longitudinal personality investigations that eventually became part of the basis for the FFM. Men who had received higher scores on the neuroticism factor 10 years earlier were the ones who received higher scores on the Midlife Crisis Scale. This finding suggests that people with chronic psychological problems are more likely to experience a phenomenon such as the midlife crisis. Other studies using a combination of interviews and questionnaires further call the midlife crisis concept into question,

One was a study conducted by the first author on nearly 100 adult men and women between the ages of 24 and 61 (Whitbourne, 1986). Among the extensive interview data collected on identity and life histories, none of the participants, even those in their 40s, fit the criteria for a midlife crisis even when they were asked specifically about the impact of aging on their identities. A second interview and questionnaire study conducted on another sample of more than 300 men ranging from age 38 to 48 ("prime time" for the midlife crisis) yielded similar findings (Farrell & Rosenberg, 1981).

The National Survey of Midlife Development in the United States (MIDUS) added another nail in the coffin to the midlife crisis concept (Wethington et al., 2004). Only 26 percent of respondents reported that they had experienced a midlife crisis, hardly the 100 percent that midlife crisis theory would predict. However, even this percentage is most likely an exaggeration because those who reported having a midlife crisis included the general experiences that everyone has in life of being aware that time is passing. Even so, when the researchers categorized these responses by age, they could detect no particular peak in the mid-40s. Some of the women in the sample even declared that the age of their midlife crisis was over 60, hardly considered "midlife" by any stretch of the imagination.

McFadden and Rawson Swan (2012) reviewed studies on midlife crisis versus midlife transition among women, including participants in the 10-year Melbourne Longitudinal Study. Their analysis showed that, once again, stages in midlife did not predict any of the well-being outcome measures, including self-esteem, life satisfaction, depression, and marital satisfaction.

Along similar lines, the findings of a study carried out in the United Kingdom asked participants ages 25 to 70 and older to recall a past crisis as occurring in the 20s, 30s, and 40s (Robinson & Wright, 2013). For each decade, about half the participants remembering back to that point in their lives recalled a crisis. Rather than being a broad existential crisis as predicted by theory, however, the issues participants reported related to problems involving relationships and finances. Additionally, people were more likely to report a crisis in the decade immediately prior to their own age. Supporting the idea that the midlife crisis (or those in the 20s and 30s) is not a universal phenomenon, the tendency to report a past crisis was more prevalent among people higher in empathy, or the sensitivity to feelings.

Related to the midlife crisis is the concept introduced by behavioural economists of the "U-shaped curve" claimed to show a steep dip in happiness during the broad swath of midlife (i.e., 35 to 60) (e.g., Blanchflower & Oswald, 2016). This idea has caught the popular imagination as support for a crisis in midlife but, like the original claims of universality, proves to be overly simplistic (Lachman et al., 2016). Data in support of the U-shaped curve fail to take into account important controls such as health, marital status, and income (Laaksonen, 2018). Looking at the supposed U-shaped curve across the world regions varying in wealth, Steptoe et al. (2015) reported that only in high-income countries could anything approaching a dip be observed. It is in these countries that income disparities lead stressed-out and struggling lower-wage earners to make negative comparisons between themselves and the very wealthy.

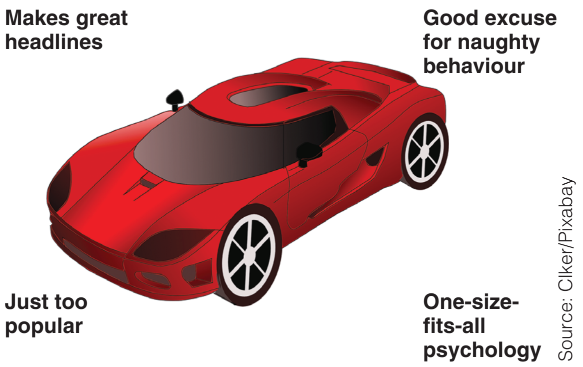
The final criticism of the U-shaped curve pertains to the size of the "U." To obtain the data on age and happiness, the economists conducting these studies ask participants to answer this question on a 10-point scale: "Overall, how satisfied are you with your life nowadays?" scored from 0 to 10. When the "U" is reported, it involves a difference between 7.2 and 7.8. Displayed on a 10-point scale, the "U" turns into a slightly wavy line. Results showing relationships to age become significant because of the very large sample sizes involved in these economic analyses.

What keeps the midlife concept alive despite the evidence suggesting it is a myth? One view is that it makes a "good story" (Rosenberg et al., 1999). The idea of a "crisis" enhances its story appeal. As shown in Figure 8.13 with the emblematic red sports car, being able to blame your midlife excesses on a crisis can justify various forms of "naughty behaviour." Because it is "one-size-fits-all" psychology, furthermore, the midlife crisis provides easy explanations for whatever problems an individual might be experiencing in midlife. Finally, it is quite likely at this point that the idea is far too popular to disappear from the media. Those hundreds of books and popular articles are unlikely to disappear soon.

The only virtue, perhaps, of having the midlife crisis become so prominent in the popular imagination is that it holds out the hope that change is possible in adulthood. This can be an important contrast to the "set in plaster" idea or even Freud's notion that change is not possible in adulthood. The "pathways"

FIGURE 8.13

Why Won't the Midlife Crisis Go Away? People for Trait Theory?


Makes great headlines
Good excuse for naughty behaviour
Just too popular
One-size-fits-all psychology

Source: Clker/Pixabay

These four factors contribute to the continued belief in popular psychology of the validity of the midlife crisis, despite research that does not support it.

model suggests that continual evaluation and readjustment of an individual's identity and life commitments can prove to be adaptive. By making it permissible for midlife adults to undergo such occasional questioning, the concept of the crisis could have a beneficial effect on people's lives.

In summary, personality is characterized in multiple ways in psychology. Studying how personality develops over adulthood may lead to the realization that you need not become hardened into a rigid pattern of set dispositions. Change is possible throughout your life, if not in predictable stages, at least in ways that allow you to feel better about yourself as you grow older. As researchers explore relationships between health and personality, they will continue to provide greater understanding of how to maximize the chances of maintaining physical functioning as well.

SUMMARY

1. Studies of personality in adulthood are based on theories that attempt to define the nature and structure of personality. Within psychodynamic theory, the primary theories involve psychosocial development, attachment, and defence mechanisms. Several major longitudinal studies have provided tests of ego psychology theories. Psychosocial development from college to midlife was the focus of the Rochester Adult Longitudinal Study (RALS), which also examined the relationship of life experiences to personality among men and women. The RALS also identified five pathways of development in adulthood including the Authentic Road, Straight and Narrow, Meandering Way, Triumphant Trail, and Downward Slope.
2. Attachment theory proposes that the earliest interactions with caregivers involve adult personality and relationships. Studies on adult age differences in attachment style show that older adults are less likely to be anxiously attached and more likely to be dismissive compared with younger adults. Older adults may have fewer attachment figures in their social networks, but those they have fit into a wider range of roles.
3. Theories based on defence mechanisms differentiate among immature, intermediate, and mature defence mechanisms. In moving through adulthood, individuals become more likely to use the mature defence mechanisms to adapt to challenges.
4. Within the trait perspective, the Five-Factor Model (FFM) has stimulated a large body of longitudinal and cross-sectional studies on personality in men and women throughout the adult age range. The five traits in the FFM include neuroticism, extroversion, openness to experience, agreeableness, and conscientiousness. There are also important individual differences in changes in personality over time: many of them related to health and behavioural risk patterns, such as the Type A behaviour pattern.
5. Socioemotional selectivity theory proposes that, over the course of adulthood, individuals select social interactions that will maximize the emotional rewards of relationships. Older adults appear better able than their younger counterparts to regulate negative affect.
6. Cognitive self-theories propose that individuals view the events in their lives from the standpoint of the relevance of these events to the self. Cognitive theories include possible selves, coping and control, and identity process theory.
7. According to the midlife crisis theory, there is a period in middle adulthood during which the individual experiences a radical alteration in personality, well-being, and goals. Subsequent researchers using a variety of empirical methods have failed to provide support for this theory, and it is generally disregarded within the field of adult development. Researchers believe that the midlife crisis makes a "good story" and may be too popular to disappear from the public imagination. Because it presents the possibility that change is possible in adulthood, however, the concept may have some value.

9

Relationships

By now you've probably realized how important staying physically and mentally active is for healthy aging. However, you can't overlook the importance of relationships! Here are some interesting facts about how social connections shape the lives of older adults.

AGEFEED

#trending

1. People with good social relationships have a **50 percent lower mortality risk** compared to those who don't.
2. Providing **support** to others can help lower one's **blood pressure**.
3. More older adults in long-term relationships are choosing not to live together or get married in a phenomenon known as **living apart together**.
4. **Strong friendships** play an important role in reducing the risk of developing chronic illness among older adults.
5. Positive relationships among **siblings** can offer protective support in older age, particularly for good health and positive mood.
6. **Older couples**, for better or for worse, often engage in the same types of health behaviours.
7. **Family relationships** promote physical health and well-being in older adults.
8. Older adults are increasingly using **online dating apps** and companies are taking note by creating apps specifically geared towards the 50-and-older market.
9. Increased TV watching among adults 65 and older (estimated to be around **47 hours/week**) is linked to social isolation.
10. **Volunteering**, especially at community-based events, positively impacts well-being for older adults.

Your relationships with others are essential to your existence throughout life. From your intimate partners to your family, friends, and the broader community, your social connections are a crucial part of who you are and how you feel on a day-to-day basis. It is difficult to capture the central qualities and complexities of these many relationships, and it is perhaps even more challenging to study the way these relationships interact with developmental processes within the individual over time. Yet researchers must be able to translate that intuitive sense of the importance of relationships into quantifiable terms that can demonstrate the nature and impact of social processes in adulthood.

Changes in the broader society of the country and world have a large impact on the nature of individual relationships. You can see from even brief glances at news stories within your social media feed that patterns of marriage and family life change significantly with each passing year. In Canada, at least, fewer people marry, and those who do are waiting longer than previous generations. Family compositions are continually changing as people leave and re-enter new long-term relationships, often involving their children and extended families as well. In this chapter, we examine these changing family patterns and try to provide an understanding of what theorists say about the qualities of close relationships and how they interact with the development of the individual.

MARRIAGE AND INTIMATE RELATIONSHIPS

The marital relationship has come under intense scrutiny in today's world. The union between two adults is thought to serve as the foundation of the entire family hierarchy that is passed along from generation to generation. You hear about the death of marriage as an institution, yet interest in marriage itself never seems to wane in the popular imagination, the media, and professional literature.

Marriage's centrality in people's lives stems in part from tradition as well as from the fact that many people define their own personal happiness in terms of their intimate relationships. There are also practical aspects of marriage, ranging from the financial benefits of having a spouse to the day-to-day needs of maintaining a household. Socially, marriage also plays a role in bringing families together, forming the basis for community ties, and becoming the basis for childrearing. All of these features serve to keep marriage a very relevant social institution.

Marriage

As a social institution, **marriage** is defined as a legally sanctioned union. People who are married are permitted to file joint income tax returns and are given virtually automatic privileges to share the rest of their finances as well as other necessities such as health care and housing. They often share a last name, usually the husband's, although many wives never change their names at least for professional purposes. In the 1970s, couples began to create a new hyphenated last name.

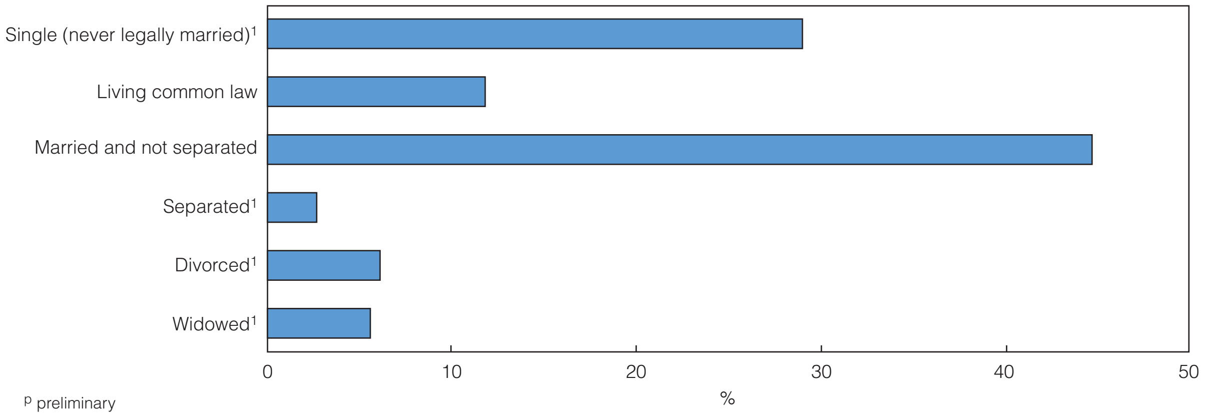
Generally, marital partners are entitled to retirement, death, and health insurance benefits as well as the entire portion of the estate when one partner dies. Although marriages need not legally conform to the statutes of a particular religion, they are often performed in a religious context.

The statistics on marriage provide important insights into the role of the marital relationship in people's lives. As you can see in Figure 9.1, in 2018, 44.7 percent of those 15 years of age and older were married and 11.8 percent were living common law (Statistics Canada, 2019b). In 2017, the average age of marriage was 28 for women and 30 for men. The reasons for the rise in age at first marriage, which currently refers to those in the millennial generation, reflect labour force characteristics, which seem to affect men and women to a similar extent (Gurrentz, 2018).

Among individuals ages 65 and older, over two-thirds of men and about half of women are living with a spouse. The

FIGURE 9.1

Marital Status of Canadians, 2018^p



^{p} preliminary
1. Not living common law.
Note: Canadians aged 15 and older as of July 1.

Source: Statistics Canada. (2019b). *Canada at a glance: Population*. (Catalogue 12-581-X). Ottawa, ON: Author. Retrieved from https://www150.statcan.gc.ca/n1/pub/12-581-x/2019001/pop-eng.htm gender disparity is even greater at age 90 and above, with 45.8 percent of men and 8.4 percent of women living with a spouse (Statistics Canada, 2019e). Women are much more likely to be widowed and are at greater risk of some of the disadvantages that come with single status, including fewer financial resources, less access to health care, and potential loss of social support.

Rates of marriage and divorce are influenced by historical events and changing laws. There were fewer marriages in the 1930s because of difficult economic times and high unemployment during the Great Depression. In 1939, when Canada became involved in World War II, some couples may have married to avoid conscription (never-married men were more likely to be conscripted). Rates of marriage were low during the war years but increased after the war. Marriage rates peaked again around 1972, when the large Baby Boom cohort married. Similarly, rates of divorce increased after 1968, when "no fault" divorce was introduced, requiring couples to be separated for three years or more. In 1986, this period was reduced to one year or more, and saw a corresponding increase in divorce rates (Milan, 2013).

Cohabitation

Living in a stable relationship prior to or instead of marrying is referred to as **cohabitation**. As you can see from the infographic in Figure 9.2 from the 2017 General Social Survey of Canadians, 15 percent of adults aged 25 to 64 lived common-law (Statistics Canada, 2019g). It is much more common in Quebec, compared to other provinces, and is less common among foreign-born Canadians. Historically, the rise in rates of cohabitation in Quebec coincided with the Quiet Revolution of the 1960s, which saw the declining influence of the Catholic church, broadened divorce legislation, more accessible contraception, and increased education and labour force participation among women (Milan, 2013).

In Canada, there has been a steady increase in the number of couples who choose this lifestyle. Common-law unions were first counted in the 1981 Census of Population and at that time represented 5.6 percent of all census families (Statistics Canada, 2012b). More recently, the percentage of those living common-law prior to getting married has risen from 25 percent in 2006 to 30 percent in 2017. The length of time living common-law prior to marriage also increased during this time interval, from 2.5 years to 3.6 years (Statistics Canada, 2019f).

According to an Angus Reid poll conducted in 2018, about half of Canadian adults indicated that, for couples that want to spend their lives together, getting legally married is neither necessary or important. As you can see from Figure 9.3, when asked to respond to the statement, "Marriage is as relevant today as it's ever been," those 65 and older were more likely to agree. In the total sample, those who identified as visible minorities were much more likely to indicate that marriage was important (Angus Reid Institute, 2018).

Most investigations of cohabitation involve younger adults, but middle-aged and older adults are also becoming increasingly likely to enter into cohabiting relationships. The percent cohabiting in the nearly 50 years between 1967 and 2017 has risen among adults 50 to 64 from 0.7 percent to 4.4 percent, with small but measurable increases in those 65 to 74 and 75 and older (Vespa, 2017).

Rather than sharing the same household, older adults also may enter into an arrangement known as **living apart together (LAT)**. This is a living arrangement increasingly adopted by unmarried older adults in an intimate relationship who do not wish to share a residence. Compared to younger adults, older adults are much less likely to indicate that they intend to move in together in the future (Turcotte, 2013).

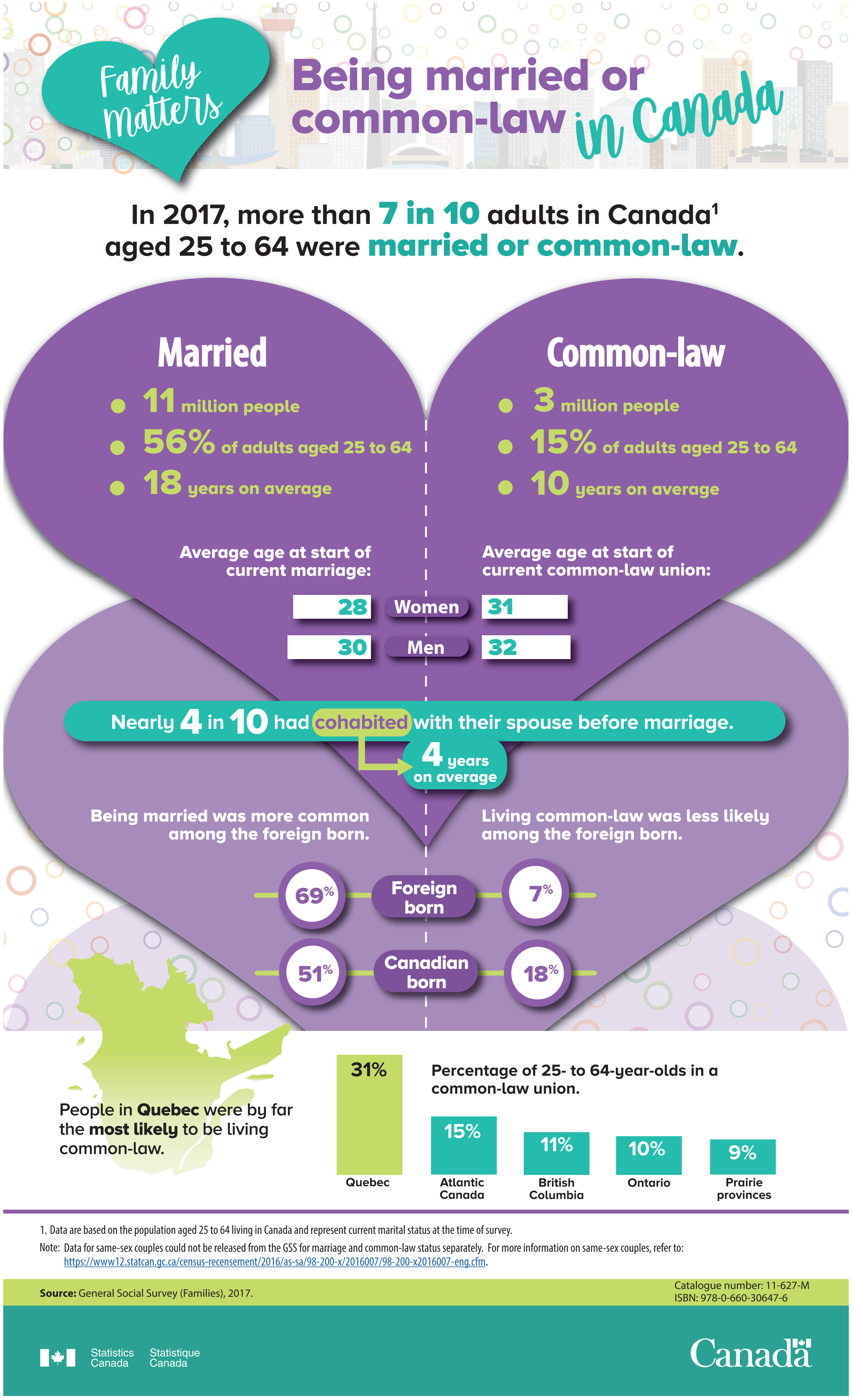
A study by Funk and Kobayashi (2016) examined the reasons for choosing the LAT lifestyle among 28 couples with an average age of 59 years, living in either Vancouver or Victoria, British Columbia. Participants indicated that they chose this option because of the personal independence it provided, as well as protection from personal risks, such as the difficult emotional experiences that they had experienced in past relationships. They also indicated that living apart protected them from the practical, financial, and legal risks associated with cohabitation. For example, some respondents cited the loss of assets from a previous marriage, and others noted the complicated legal and financial consequences associated with separation.

Although the common-sense wisdom is that the experience of living together contributes positively to the success of a marriage, the opposite seems to be true, at least in part. Data on divorce patterns show that there is a greater risk of marital breakup among people who cohabited before they became engaged. According to the General Social Survey, those age 25 to 64 who were previously common-law were twice as likely to have experienced multiple separations or divorces compared to those who were previously married (Statistics Canada, 2019i). The greater likelihood of divorce among couples who cohabit before becoming engaged is referred to as the **cohabitation effect** (Cohan & Kleinbaum, 2002).

One explanation for the cohabitation effect is that couples who would not have gotten married "slide" into marriage through inertia; in other words, the fact that they were already living together becomes the basis for entering into marriage, even if the fit between the two partners is not all that good. Eventually, they divorce because they were not well matched at the outset. Indeed, it appears that young adult cohabiting couples are more likely than other married or older cohabiting status groups to believe that divorce is the best solution if a couple's relationship is not working out (Nugent & Daugherty, 2018).

To try to tease out the causal links involved in the cohabitation effect, Lu and colleagues (2012) evaluated the likelihood of a cohabiting relationship ending after controlling for demographic characteristics of the partners prior to their cohabitation. Rather than compare cohabiting with non-cohabiting partners, they separated out individuals who had engaged in "serial" cohabitation, meaning that they had lived with more than one partner in a cohabiting relationship. This turned out to be an important control. People who had cohabited only with their spouse prior to marriage did not show the cohabitation effect. It was only those serial cohabiters who showed higher rates of marital disruption. However, trends in serial cohabitation may be changing, as among younger cohorts of women, those who have entered into multiple cohabitations appear to have less of an interest in marrying (Vespa, 2014).

FIGURE 9.2



Family Matters

Being married or common-law in Canada

In 2017, more than **7 in 10** adults in Canada[1] aged 25 to 64 were **married or common-law**.

Married

- **11** million people
- **56%** of adults aged 25 to 64
- **18** years on average

Average age at start of current marriage:

Common-law

- **3** million people
- **15%** of adults aged 25 to 64
- **10** years on average

Average age at start of current common-law union:

Married		Common-law
28	Women	31
30	Men	32

Nearly **4** in **10** had cohabited with their spouse before marriage.

4 years on average

Being married was more common among the foreign born.

Living common-law was less likely among the foreign born.

Married		Common-law
69%	Foreign born	7%
51%	Canadian born	18%

People in **Quebec** were by far the **most likely** to be living common-law.

Percentage of 25- to 64-year-olds in a common-law union.

1. Data are based on the population aged 25 to 64 living in Canada and represent current marital status at the time of survey.

Note: Data for same-sex couples could not be released from the GSS for marriage and common-law status separately. For more information on same-sex couples, refer to: https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016007/98-200-x2016007-eng.cfm.

Source: General Social Survey (Families), 2017.

Catalogue number: 11-627-M
ISBN: 978-0-660-30647-6

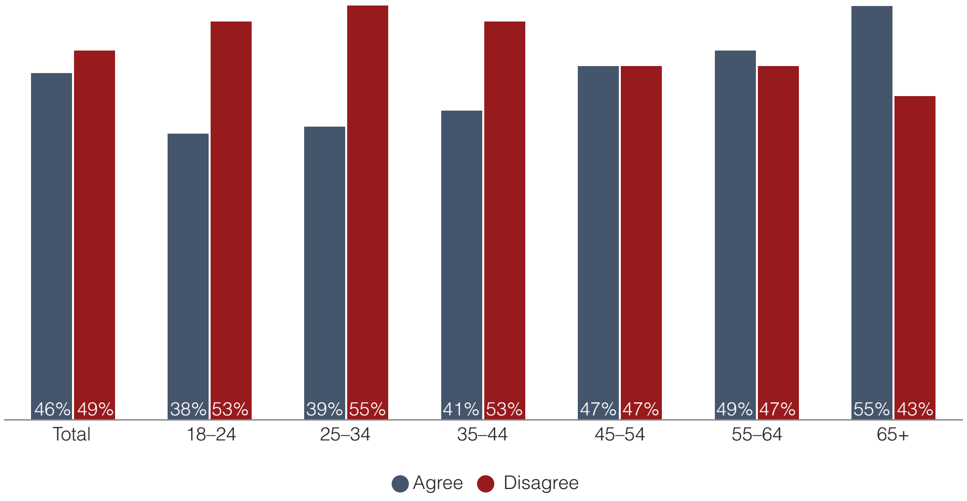
Statistics Canada Statistique Canada

Canada

Source: Statistics Canada. (2019g). *Family matters: Being married or common-law in Canada*. (Catalogue 11-627-M). Ottawa, ON: Author. Retrieved from https://www150.statcan.gc.ca/n1/pub/11-627-m/11-627-m2019031-eng.htm

FIGURE 9.3

Marriage Is Just as Relevant Today as It's Ever Been: Percentage of Respondents that Agree and Disagree



Source: *'I don't': Four-in-ten Canadian adults have never married, and aren't sure they want to*. Retrieved from: http://angusreid.org/marriage-trends-canada/ Reprinted with the permission of the Angus Reid Institute.

Same-Sex Couples

In Canada, marriage between same-sex couples became legal in 2005, making it the third country in the world to enact this legislation, after the Netherlands and Belgium. (Spain approved same-sex marriage the day after Canada.) In 2016, there were 72,880 same-sex couples in Canada, or about 1 percent of all couples, with a fairly even split between male and female same-sex couples, and about one-third were married. Approximately 12 percent of same-sex couples lived with children compared to about half of opposite-sex couples (Statistics Canada, 2017j). As of July, 2020, same-sex marriages were considered legal in 31 countries, at least in some jurisdictions, with Costa Rica being the most recent addition in May of 2020. Figure 9.4 represents the countries where same-sex marriage is legal (Masci & Desilver, 2019).

Research on same-sex couples in marital relationships suggests that, compared to women in different-sex couples, both women and men in same-sex couples experience less strain on a daily basis (Garcia & Umberson, 2019). However, a 12-year follow-up study of same-sex couples showed higher rates of dissolution among female–female couples than different-sex married couples. In general, though, women are more likely to initiate divorce when they are dissatisfied in their relationship, whether in a same- or different-sex relationship (Balsam et al., 2017).

Sexual orientation discrimination stress may play a role in the dynamics of same-sex couples. People who believe that they are the targets of such discrimination are more likely to experience depression, especially if they cannot depend on their partners to help them cope with their feelings of stress (Randall et al., 2017). Such factors can affect both male–male and female–female couples, but seem to present a particular risk factor for women in same-sex relationships (Khaddouma et al., 2015). However, findings on same-sex relationships may be skewed by the relatively recent availability of data on those who have legalized their union. A short-term follow-up of those in legally sanctioned relationships showed that such formalization was a predictor of a relationship's stability and the satisfaction of both partners (Whitton et al., 2015).

Divorce, Separation, and Remarriage

The 1968 Divorce Act established no-fault divorce in Canada, after a three-year separation. This was amended in 1986 to a one-year separation period. Changes to the Family Divorce Act are anticipated in 2021, at which time they will be implemented over two to three years. These changes will promote the best interests of the child, address family violence, help to reduce family poverty, and make the family justice system more accessible and efficient (Department of Justice, 2020b).

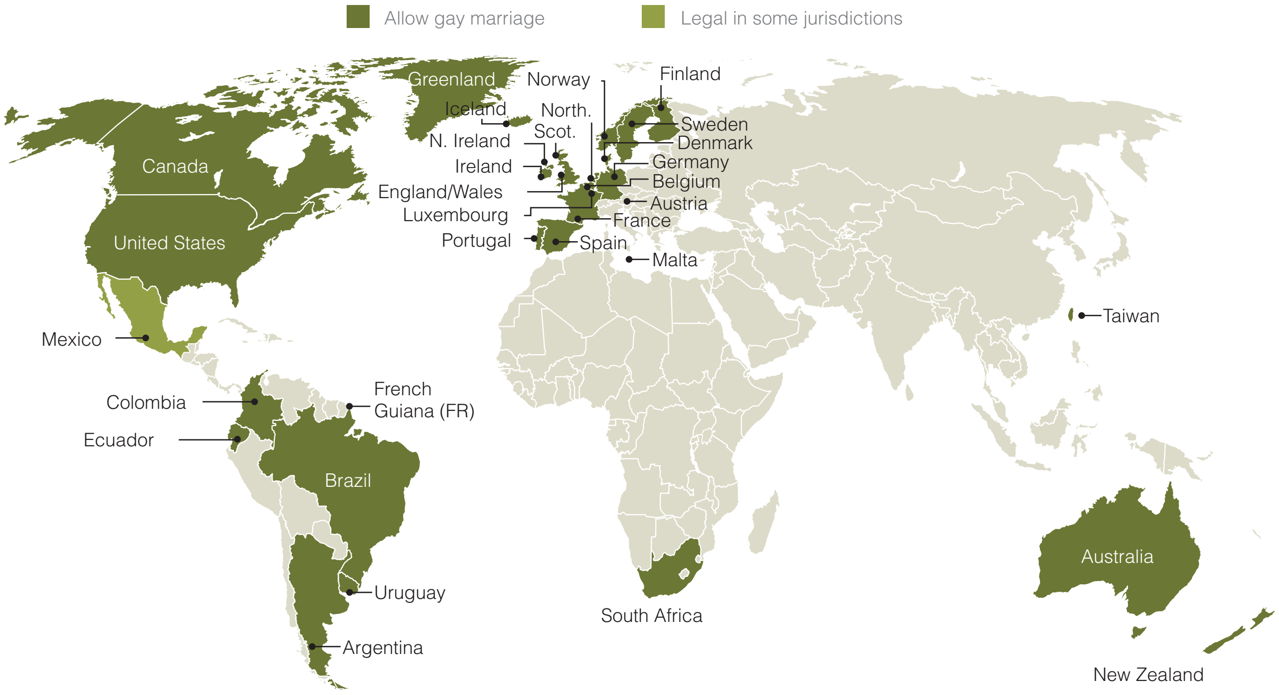
As indicated in Figure 9.1, in 2018, 6.1 percent of Canadians were divorced and 2.7 percent were separated. Average age at last separation or divorce was 47 years for men and 45 years for women. There has been an increase in divorce and separation among those 55 and older. In this age group, the highest rates are among women (16 percent), residents of Quebec (17 percent), and those who are Canadian born versus foreign-born (15 percent) (Statistics Canada, 2019h).

Most young adults who divorce will re-partner into a new marriage or cohabitation relationship; however, this is not the case for older adults. People who do not remarry or cohabit after divorce are important to study because they are at an economic disadvantage. They do not enjoy the economies of scale and cost-sharing that comes with living with someone and they may have child and/or spousal support payments. In Canada, this group has grown tenfold from 1971 to 2018

FIGURE 9.4

Gay marriage around the world

Countries that allow gay marriage or where it is legal in some jurisdictions



Source: Masci, D., & Desilver, D. (2019). A global snapshot of same-sex marriage. Washington, DC: Pew Research Center. Retrieved from https://www.pewresearch.org/fact-tank/2019/10/29/global-snapshot-same-sex-marriage/ Reproduced with the permission of the Pew Research Center.

(Margolis & Choi, 2020). There are data to support a decrease in gender inequality among divorced women and men, with women experiencing improved economic circumstances and men experiencing worse economic circumstances (Margolis & Choi, 2020). Although these authors were unable to identify the precise reasons for this, they speculate that it may have to do with the social welfare system for children and lone parents. Children of divorced parents most likely live with the mother and child benefits go to the mother. These authors also suggest that their data may underestimate the economic disadvantage of divorced men.

The dissolution of a marriage is ordinarily perceived by those involved as a disappointment and a sad if not tragic event. One or both of the partners may be relieved to see the end of an unsuccessful relationship, but they are nevertheless affected in many ways by the inevitable consequences of the divorce on their daily lives, the lives of children, and the lives of extended family members. The couple must resolve a range of practical issues, such as changes in their housing and financial affairs—but the greatest toll is the emotional one. For many couples, child custody arrangements present the most significant challenge caused by their altered status as a family.

Although technically divorce rates in the population as a whole have declined, the media frequently cite the disturbing statistic that one out of every two marriages will end in divorce. However, the divorce statistics are much more complicated than this simple formula would imply. Those who divorce in a given year are generally not the same people as those who have gotten married, so the number of divorces cannot simply be compared with the number of marriages to determine the odds of divorcing.

The probability of divorce is higher for people who are in their second marriage. Remarried individuals may further inflate divorce statistics because they include those high in **divorce proneness**, the greater tendency to contemplate divorce when their marriage is in trouble (Whitton et al., 2013). Those high in divorce proneness may have a long history of difficulties in the area of intimacy. Data from the RALS (described in Chapter 8) showed that women who in college had low intimacy scores were more likely to have divorced by their late 50s; the same was not true for men (Weinberger et al., 2008).

Separated and divorced individuals often cite infidelity as the cause of their breakup. Data from a national survey conducted in the United States between 1991 and 2008 reveal that more than half of men and women who engage in extramarital affairs also become separated or divorced from their spouses (Allen & Atkins, 2012). People who are in a troubled marriage may become unfaithful because they are unhappy with their spouses. For these individuals, the extramarital affair provides the final push towards seeking a divorce, particularly if it is the other partner who has the affair. By the same token, people who have an affair and then say their marriage was unhappy may be using identity assimilation, seeking to protect their identities as good spouses.

Identity may also play a role in how individuals cope emotionally with divorce. A wide range of negative emotional outcomes are associated with divorce. People who are divorcing experience such feelings as loss of trust, low self-esteem, anxiety, worry about being hurt in future relationships, anger, depression, and preoccupation with what other people think. For some individuals, however, divorce provides relief from a highly conflictual situation.

You might think that the initiator would have fewer negative emotions than the non-initiator, but the individual's role in the divorce does not clearly relate to the emotional outcome. Some divorced couples seem to transition into post-divorce relationships in which they remain friends or share in parenting or operating a joint business. Frisby et al. (2012) proposed that one of the most difficult aspects of divorce is loss of "face," meaning that divorce represents a threat to the individual's identity. Individuals divorced within the prior two years had more positive emotions if they were able to see the divorce as allowing them to gain independence and were supported by their partner in protecting their identities.

Approximately one-quarter of the 5 million Canadians who had divorced or separated within the last 20 years had at least one child together, aged 18 years or younger. The majority of these children lived in the mother's home (70 percent), far fewer lived in the father's home (15 percent), and an additional 9 percent lived at both residences (Sinha, 2014). As difficult as it is for children to be caught between parents who are divorced, it may be just as hard, if not harder, to be caught between parents who are in a high-conflict marriage. In one longitudinal study of marriage, children 19 years of age and older were asked to state whether they felt they had been caught in parental arguments. The children of parents whose marriages were characterized by a high degree of conflict were most likely to feel caught in the middle. Not surprisingly, these feelings were related to lower subjective well-being and poorer relationships with their parents (Amato & Afifi, 2006). Poor relationships between parents and a child's step-parents (i.e. when one parent remarries) further accentuate the feeling of being caught when the child reaches young adulthood (Schrodt, 2016).

Among divorced couples, mediation is increasingly being seen as an effective means of reducing conflict and thereby improving children's adjustment. Mediation is based on a model of co-operative dispute settlement rather than the more adversarial approach that occurs when lawyers become part of the scene. In one 12-year longitudinal study, divorced couples were randomly assigned to either mediation or legal assistance. Conflict significantly declined among couples who participated in mediation, particularly in the first year after divorce (Sbarra & Emery, 2008). Involving the children in the remediation process can also help promote their ability to adjust to the divorce and its impact on the family (D'Onofrio & Emery, 2019).

Widowhood

The death of a spouse is regarded as one of the most stressful events of life, and for many older adults, widowhood involves the loss of a relationship that may have lasted 50 years or more. As we shall see, however, the effect of widowhood on the bereaved individual varies greatly according to the circumstances surrounding the spouse's death and the nature of the couple's relationship.

In 2019, there were approximately 1.8 million widows and widowers in Canada, just under 5 percent of the population (Statistics Canada, 2019e). Among older adults, women are significantly more likely than men to become widowed. Among those 65 years of age and older, about one-third of women will be widowed versus about 10 percent of men. For women 90 years of age and older, over 80 percent are widowed (Statistics Canada, 2019e). Widows are more likely than widowers to live at low-income levels.

The prevalence of depression diminishes over time, from 30 percent in the month after the spouse's death to 19 percent from 12 to 18 months following widowhood, to 10.5 percent in the two to five years after the death of the spouse (Kristiansen et al., 2019a). Widows are also at risk for anxiety disorders, showing a 29.5 percent prevalence rate (Kristiansen et al., 2019b). Negative mental health outcomes are more pronounced when the spouse's death is not anticipated, in part because a partner caring for a terminally ill spouse becomes relieved of caregiver burden with the spouse's death (Siflinger, 2017).

In what is called the **widowhood effect**, there is a greater probability of death in those who have become widowed compared to those who are married (Williams et al., 2011). The mortality effects hold even after controlling for various health risks or causes of death, because widowed individuals have a higher risk of mortality than the non-widowed. Contributing to the widowhood effect are factors such as depression, psychosocial stress, chronic economic hardship, and loss of social support and environmental resources.

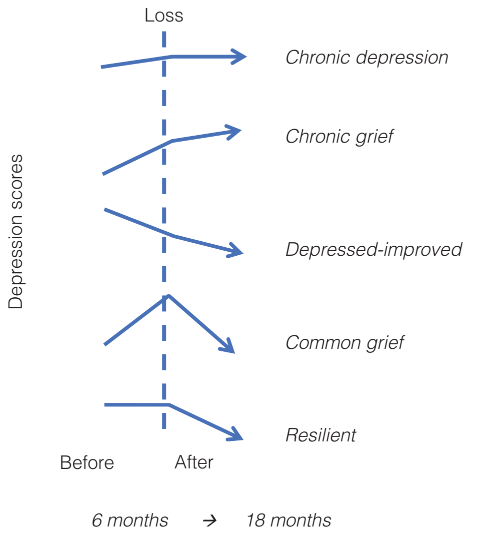
There are variations in the pattern of adaptation to the loss of a spouse (see Figure 9.5). In a major prospective study of more than 200 widows, Bonanno and his collaborators (2002) followed women for 18 months after the death of their husbands. The majority showed relatively little distress following their loss, in a pattern called "resilient grief." However, some widows experienced chronic grief that did not subside during the study period and showed high levels prior to and after the loss. Similar pathways exist among widowers, who like widows, are most likely to show patterns of resilience (Bennett, 2010). Studies such as these underscore the notion that widowhood is not a unitary process and that there are multiple factors influencing reactions to the loss of a spouse.

Psychological Perspectives on Long-Term Relationships

Throughout the vicissitudes of marriage, divorce, remarriage, and widowhood, most adults actively strive to maintain gratifying interactions with others on a day-to-day basis. Furthermore, for many adults, the feeling of being part of a close relationship or network of relationships is the most salient aspect of identity (Whitbourne, 1986). Whether this relationship is called "marriage," "family," "friendship," or "partnership" is not as important as the feeling that one is valued by others and has something to offer to improve the lives of other people.

FIGURE 9.5

Levels of Depression in Five Types of Widows



Research on widowhood shows there are five characteristic patterns with resilient being the most common.

Theories of long-term relationship dynamics attempt to understand the factors that contribute to successful relationships over the course of adulthood. Figure 9.6 summarizes the six main perspectives on long-term relationships that address issues relevant to adult development and aging.

The earliest sociological explanations of relationship satisfaction across the years of marriage used a family life-cycle approach in which marital satisfaction among couples was charted in relationship to the ages of their children. As relationships in the real world have seemed to become more complicated, however, so have the theories, and there is now greater recognition of the multiple variations that are possible when adults form close relationships. The emotional factors involved in long-term relationships are also gaining greater attention, as it is realized that some characteristics of human interactions transcend specific age- or gender-based boundaries.

Looking first at socioemotional selectivity theory (introduced in Chapter 8), it very specifically predicts that older adults become more satisfied with their long-term partners as their awareness increases of the limited time they have left together with each passing year. Older adults should regard the long-term marital relationship as offering perhaps the most potential to serve emotional functions because their experience together over the years has allowed them to understand and respond to each other's needs. In what is called "positive sentiment override," older adults are more likely to keep sight of the positive aspects of their relationships even when they have disagreements (Story et al., 2007). In addition, if older adults are better able to control their emotions, particularly the negative ones, they should get along better with their partner because each is less likely to irritate the other one.

FIGURE 9.6

Perspectives on Long-Term Relationships

Socioemotional selectivity theory
Social exchange theory
Equity theory
Similarity
Need complementarity
Suffocation model

Six prominent psychological perspectives on long-term relationships.

Social exchange theory attempts to predict why some relationships succeed and others fail in terms of whether the relationship's rewards exceed the costs of alternatives to that relationship. The rewards of marriage include love, friendship, and feelings of commitment. When considering a breakup, partners weigh these benefits against legal, financial, social, and religious barriers or constraints. Children will also factor into this equation, adding both to the perceived benefits, such as co-parenting and to the costs, which include child custody. When the balance shifts so that the rewards no longer outweigh the costs, one or both partners will initiate a breakup. Over time, exchange theory predicts that the intrinsic rewards of being in the relationship, including the reliance the partners develop towards each other, increase to the point that the attractiveness of alternatives tends to fade.

Several studies support social exchange theory to explain some of the pragmatic factors the keep partners together. Some approaches focus on income as a factor in the exchange dynamics such that a partner's earning potential becomes part of what makes that partner attractive (Sweeney & Cancian, 2004). A study of same-sex couples showed, furthermore, that a partner's earning potential also influenced the division of household labour (Yabiku & Gager, 2009). Also in support of social exchange theory, a study of cohabiting versus married couples showed that cohabitors were more likely than married partners to end a relationship in which the partners only rarely engaged in sex (Yabiku & Gager, 2009).

Social exchange theory, then proposes a cost–benefit approach to a relationship's formation and maintenance. In contrast, **equity theory** proposes that partners are satisfied in a relationship if they feel they are getting what they deserve (Walster et al., 1978). This means that they seek to get as much out of the relationship as they put into it (Hatfield & Rapson, 2012). Equity theory proposes, then, that partners will constantly try to adjust their efforts to match each other's contribution to the relationship according to principles of fairness. The couple's relationship quality will erode if the amount one partner puts in does not match what the other partner contributes (Hatfield et al., 2008). In a 20-year longitudinal study of married couples, DeMaris (2010) found that partners were able to gauge correctly the amount of effort each of them put into the relationship, but women tended to view themselves as putting more in than did their husbands.

Another set of theories examines the extent to which a matching of characteristics between partners helps to predict relationship satisfaction. The **similarity hypothesis** proposes that similarity of personality and values predicts both initial interpersonal attraction and satisfaction within long-term relationships (Gaunt, 2006). Sometimes, the similarity may be more apparent than real, however. In one 13-year longitudinal study of marital relationships, researchers found that couples who perceived each other as higher in agreeableness than they actually were in reality were more in love during the early stages of marriage and more likely to remain in love over time (Miller et al., 2006). Subsequent research supports the role of positive illusions about the spouse's personality as contributing to marital quality (Barelds & Dijkstra, 2011).

The **need complementarity hypothesis** proposes that people seek and are more satisfied with marital partners who are the opposite of themselves (Winch, 1958). Perceptions of complementarity could benefit relationships when partners regard themselves as being on the same "team" (Beach et al., 2001). People who are more introverted, for example, might prefer partners whose extraversion helps alleviate discomfort in social situations.

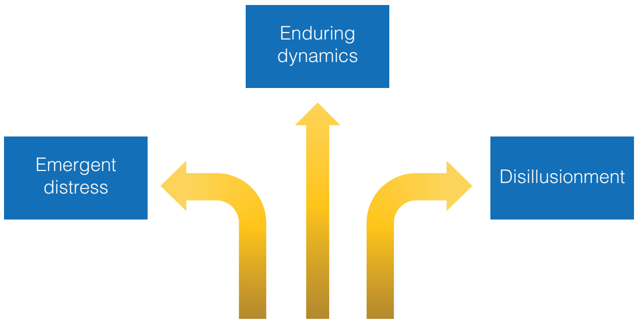
The **behavioural approach to marital interactions** emphasizes the actual behaviours that partners engage in with each other during marital interactions as an influence on marital stability and quality (Karney & Bradbury, 1997). According to this perspective, people will be more satisfied in a long-term relationship when their partners engage in positive or rewarding behaviours (such as expressing affection) and less satisfied when they are critical or abusive. Conflict increases when a partner either turns away from or turns against a partner who is trying to make an emotional connection (Gottman & Driver, 2005). Behavioural approaches to relationship satisfaction emphasize, then, that conflict need not be detrimental as long as it is constructive in nature (Ostenson & Zhang, 2014).

Finally, the latest approach to understanding marital satisfaction emphasizes the role of individual fulfillment within the context of the couple. According to Finkel et al.'s (2015) **suffocation model of marriage**, contemporary adults place more emphasis on marriage as a source of self-expression and fulfillment but have less time to devote to maintaining their marriages than ever before. Using the metaphor of "climbing Mount Maslow" (Finkel et al., 2014), the suffocation model proposes that the higher a couple attempts to move up the hierarchy of needs (from security to self-actualization), the more frustrated they will become with the quality of their relationship.

As you can see, theories of relationship satisfaction each have their own set of predictions about who will be happiest in a long-term relationship. From an empirical perspective, though, the key question remains whether research on long-term relationships bear out any of their predictions. As it turns out, there may be value to all of them because, as in personality development, there is more than one pathway in relationship development. A 13-year longitudinal study by University of Texas family psychologist Ted Huston and his collaborators (Huston, 2009) is based on the concept of pathways, showing the various routes that couples take as they navigate at least the first 13 years of their relationships (see Figure 9.7).

FIGURE 9.7

Pathways in Long-Term Relationships



Pathways in the early phases of committed relationships as they evolve over time.

The surprising feature of Huston's work was his discovery that the seeds of marital bliss, or trouble, are sown even before the couple walks down the aisle. In the **enduring dynamics pathway**, the way a couple interacts early in their relationship will characterize the course of the relationship over time. They either get along well with each other and resolve conflict easily, or they don't.

There are, however, couples whose problems evolve over time. Those who fit the **emergent distress pathway** develop relationship problems over time as they find that they are unable to cope with the inevitable arguments that occur when people live together. Instead of resolving their problems with adaptive tactics such as communicating openly and working out compromises, they become defensive, withdraw, stonewall, and become blatantly vicious towards each other. It's not clear whether their distress causes these dysfunctional coping methods or whether their ineffective ways of handling problems lead to distress. The upshot is that these couples become increasingly unhappy over time until they finally decide to end things.

Like couples who experience emergent distress, those who fit the **disillusionment pathway** start out happy and in love when they first tie the knot. Over time, they gradually fall out of love and begin to develop mixed feelings about their partner. Part of what happens with these couples is that they take each other for granted. They become less and less interested in seeking their partner's love and approval than they were at the beginning, and as the patina fades, they drift farther and farther apart.

Both the emergent distress and disillusionment models assume that couples start out as hopeful and optimistic that their relationship will work out; it is only after the months or years go by that they find themselves arguing constantly or just losing interest.

After following their couples 2 and 13 years after marriage, Huston and his team concluded that their data gave the most support to the enduring dynamics model of distress. Rather than newlyweds being head over heels in love, only to have the relationship unravel over time, it was the dynamics that characterized the beginning of a relationship that persisted over time. Two key features seemed to differentiate the happy from the unhappy couples: positive expressions of affection and love and negative behaviours of being critical, angry, and impatient towards the partner. The happy couples expressed their love through affectionate behaviours, enjoyed being together, and made sure they spent time together. The unhappy ones created a negative emotional climate and avoided being with each other. The more in love the couple were, the more they expressed their positive feelings towards each other, including initiating sexual activity (Schoenfeld et al., 2012).

Such marital discord for unhappy couples takes its toll on well-being. Couples in their later years who are constantly in conflict are at risk of experiencing higher levels of depression and anxiety, and lower levels of self-esteem and life satisfaction (Whisman et al., 2006).

For couples who want to work on a troubled relationship, couples therapy is a known effective method for promoting positive change (Davis et al., 2012). Although couples therapy shares many features of individual therapy, there are important differences. Couples therapists are trained to examine the types of interactive patterns that lead couples into conflict and then, more importantly, to help them break those dysfunctional patterns. They tend to be more "take charge" than individual therapists are, actively intervening when they see problems unfolding before them during therapy sessions. As the couple learns to see their strengths and feel that change is possible, they can come to new understandings of themselves and their relationship (Benson et al., 2012).

Sexuality remains an important component of happy relationships throughout adulthood. Although you may imagine that older adults lose interest in sex, those who are in good physical health seem to maintain a virtually lifelong desire to engage in sexual relations (Lindau & Gavrilova, 2010).

Over 40 percent of women and men in the 75 to 84 age range engage in yearly (if not more) sexual intercourse. Furthermore, a considerable number were engaged in some form of sexual activity on a much more frequent basis, with over half of women and men (54 percent) in the 75- to 85-year-old age bracket having sex two to three times a month, or more. Approximately one-third in this age group also engaged in oral sex (Waite et al., 2009). It appears, then, that the majority of adults in their mid-50s and above find ways to incorporate sexuality into their lives on a regular basis, particularly if they are in an intimate relationship.

FAMILIES

The transformation of a couple into a "family" is traditionally thought to occur when a child enters the couple's life on a permanent basis. However, with changing patterns of marriage, cohabitation, and decisions about children, the definition of "family" is expanding to include a wider variety of choices in living arrangements. As indicated by the Vanier Institute of the Family, "there is no single story to tell, because families are as diverse as the people who comprise them" (Battams, 2018, p. 3). Thus, the immense diversity in the Canadian population is reflected in its families.

Despite population trends towards more lone-parent and cohabiting families, the large majority of households in Canada consist of people living together as a family. As indicated in Figure 9.8, there were almost 14.1 million private households in Canada in 2016 and two-thirds were composed of at least one census family, defined as married or common-law, with or without children, and lone-parent families. For the first time, one-person households were the most common type of household, accounting for 28.2 percent (Statistics Canada, 2017g). Overall, more Canadians are living alone and without children. Factors contributing to this trend include greater economic independence than in the past, particularly among older age groups, higher separation and divorce rates, and population aging and higher life expectancy. More older adults, especially women, live alone compared to other age groups. Interestingly, the number of older women living alone has decreased since 2001, as men have had larger gains in their life expectancy and are living with their partners longer.

The 2016 census data also indicated an increase in couples living without children compared to those living with children to a point where the percent is almost equivalent at 25.8 percent and 26.5 percent, respectively. The fastest growing household was the multigenerational household. Currently at 2.9 percent, this represents an increase of 37.5 percent since 2001. This trend was most common among Aboriginal and immigrant populations (Statistics Canada 2017g).

Parenthood

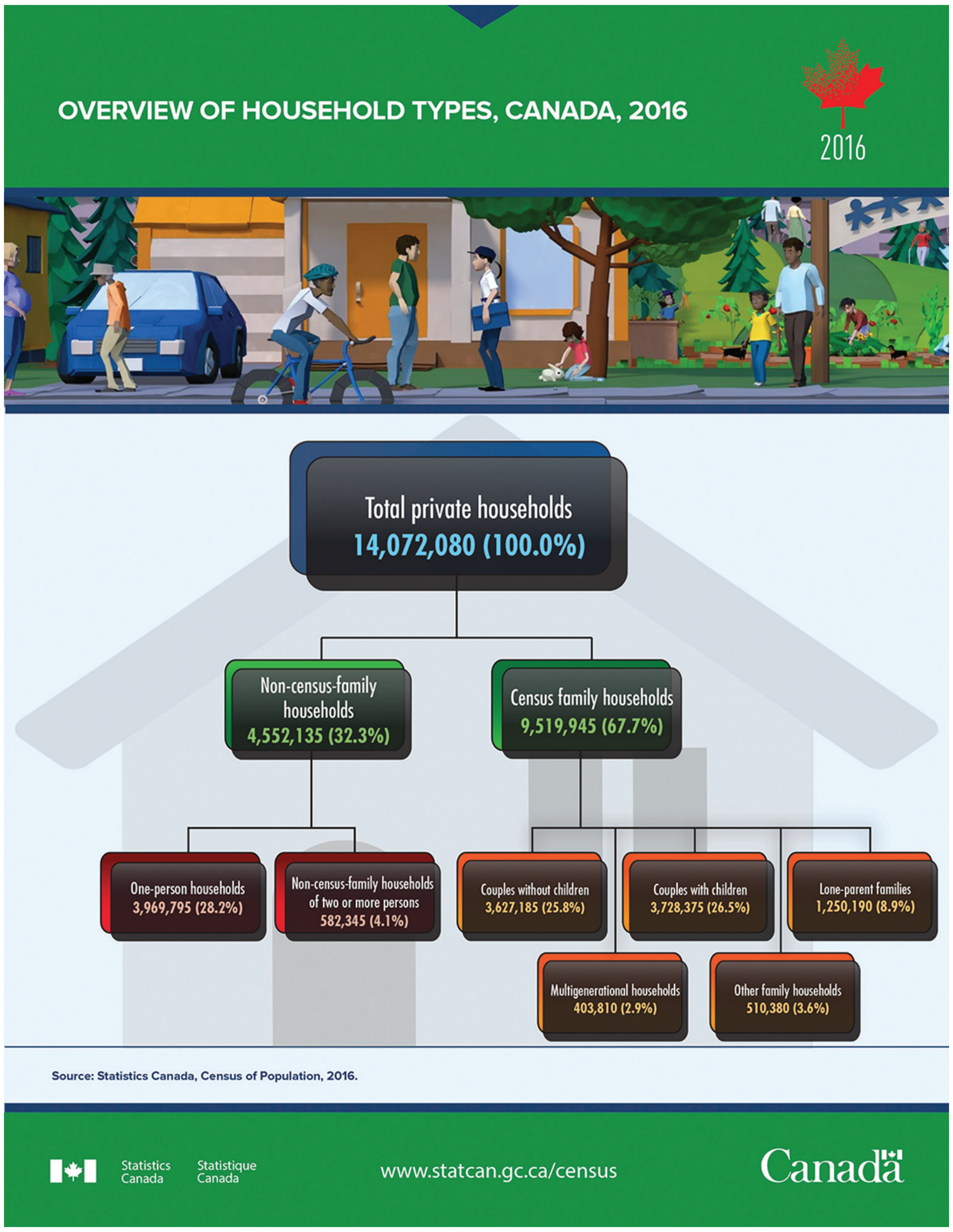
The number of births in Canada in 2018 was 372,329, or 10.5 per 1,000 in the population. This figure represents a 1 percent drop from 2017. Over the past four decades, age-specific fertility rates have declined for all age groups under 30 but have generally increased for those 30 years of age and older. In 2016, women had their first child at an average age of 29.2 years. This age has been increasing steadily since the mid-1960s (Provencher et al., 2018).

Figure 9.9 provides an overview of where children, between the ages of 0 to 14, are living (Statistics Canada, 2017i). As you can see, 19.2 percent live in lone-parent families, with or without other relatives in the home, and this percentage is higher among older children. A trend over the past few decades is an increasing number of older children in lone-parent families with their fathers, in recognition of the increasing rights of fathers and, in the event of divorce, the trend towards awarding fathers joint custody. Also, about 1 in 10 children are living in a stepfamily, a percentage that remained quite stable from 2011 to 2016. An additional 1.4 percent of children are living with grandparents, other relatives, or are in foster care.

Figure 9.10 shows one of the major historical trends, the number of young adults living with their parents (Statistics Canada, 2017m). In 2016, a little over one-third of adults aged 20 to 34 lived with parents. This trend reflects both those who have never left home and those who have returned home and may reflect some combination of cultural preferences, being in school, trying to find full-time employment, low employment earnings, or the high cost of living in some cities, such as Vancouver or Toronto.

FIGURE 9.8

Overview of Household Types, Canada, 2016


OVERVIEW OF HOUSEHOLD TYPES, CANADA, 2016
2016
Total private households
14,072,080 (100.0%)
Non-census-family households
4,552,135 (32.3%)
Census family households
9,519,945 (67.7%)
One-person households
3,969,795 (28.2%)
Non-census-family households of two or more persons
582,345 (4.1%)
Couples without children
3,627,185 (25.8%)
Couples with children
3,728,375 (26.5%)
Lone-parent families
1,250,190 (8.9%)
Multigenerational households
403,810 (2.9%)
Other family households
510,380 (3.6%)
Source: Statistics Canada, Census of Population, 2016.
Statistics Canada
Statistique Canada
www.statcan.gc.ca/census
Canadä

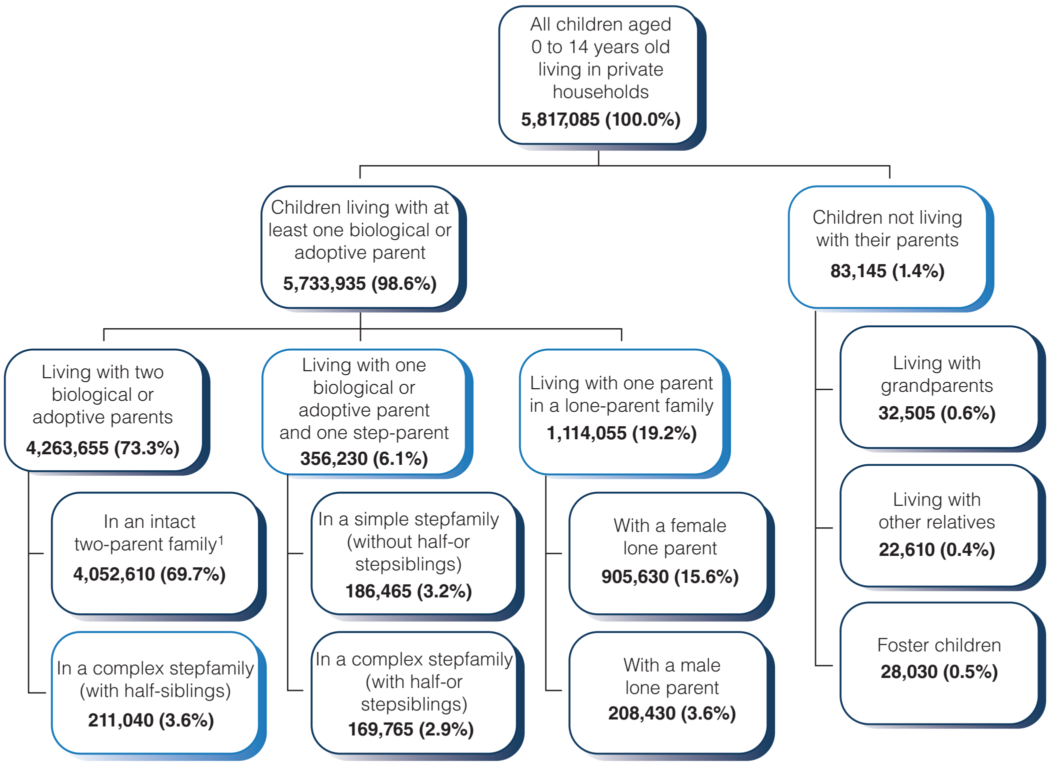
Source: Statistics Canada. (2017g). *Families, households and marital status: Key results from the 2016 Census*. In *The Daily*, Wednesday, August 2, 2017. (Catalogue no. 11-001-X). Ottawa, ON: Author. Retrieved from https://www150.statcan.gc.ca/n1/en/daily-quotidien/170802/dq170802a-eng.pdf

The point when a couple has its first child ushers in the **transition to parenthood (TtP)**, the period of adjustment to the new family status represented by the presence of a child in the home. From a biopsychosocial perspective, the TtP involves biological changes (when the mother bears the child) as her body adapts to rapid hormonal and other physiological alterations. Both parents experience psychological changes, including the emotional highs and lows associated with this new status. At the same time, each individual's identity shifts as the parents begin to incorporate their new status in life into their sense of self. They also undergo social changes as a result of this new role that alters their status with other family members and the community. Their new role brings changes in what society expects of them, expectations that typically reflect social norms for men and women as fathers and mothers.

Researchers initially became interested in the TtP because they had consistently found (mainly through cross-sectional studies) that marital satisfaction dips during the child-rearing years, a drop-off particularly marked for women. Researchers now use a prospective design, studying couples before and after

FIGURE 9.9

Overview of Children's Family Situations in Private Households, Canada, 2016

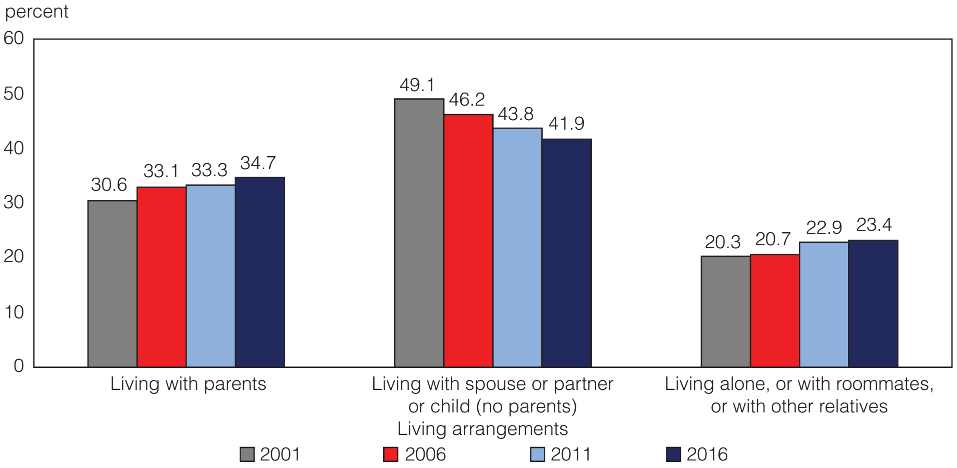

All children aged 0 to 14 years old living in private households
5,817,085 (100.0%)
Children living with at least one biological or adoptive parent
5,733,935 (98.6%)
Children not living with their parents
83,145 (1.4%)
Living with two biological or adoptive parents
4,263,655 (73.3%)
Living with one biological or adoptive parent and one step-parent
356,230 (6.1%)
Living with one parent in a lone-parent family
1,114,055 (19.2%)
Living with grandparents
32,505 (0.6%)
In an intact two-parent family[1]
4,052,610 (69.7%)
In a simple stepfamily (without half-or stepsiblings)
186,465 (3.2%)
With a female lone parent
905,630 (15.6%)
Living with other relatives
22,610 (0.4%)
In a complex stepfamily (with half-siblings)
211,040 (3.6%)
In a complex stepfamily (with half-or stepsiblings)
169,765 (2.9%)
With a male lone parent
208,430 (3.6%)
Foster children
28,030 (0.5%)

1. An intact two-parent family refers to a two-parent family that is not a stepfamily.
Note: In this overview of children's family situations, the categories in light blue correspond to family situations other than an intact two-parent family.

Source: Statistics Canada. (2017i). *Portrait of children's family life in Canada in 2016*. Ottawa, ON: Author. Retrieved from https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016006/98-200-x2016006-eng.pdf

FIGURE 9.10

Living Arrangements of Young Adults Aged 20 to 34, Canada, 2001 to 2016



Source: Statistics Canada. (2017m). *Young adults living with their parents In Canada in 2016*. (Catalogue no. 98-200-X2016008). Ottawa, ON: Author. Retrieved from https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016008/98-200-x2016008-eng.cfm the child's birth. The majority of these involve studies of the couple after the mother becomes pregnant.

In a meta-analysis of studies using this design, Mitnick and her collaborators (2009) identified 37 studies with sample sizes ranging from 23 to 400 individuals who were, on average, in their late 20s. Although most of the studies they analyzed showed a slight decline in relationship satisfaction, this was comparable to non-parents together for similar lengths of time as the new parents.

There are, as you might imagine, individual differences in the way couples adapt across the TtP. The birth of a child can trigger difficult feelings for individuals who were themselves insecurely attached to their own caregivers (Simpson & Rhodes, 2019). Couples must also negotiate the changes in their identities that accompany entry into parenthood if they are to maintain their well-being (Turner-Zwinkels & Spini, 2019). Their ability to adapt to the TtP can also affect each other's well-being, as was shown in a study of the contagious effects of a mother's depression late in pregnancy to the father's own levels of depression (Fredriksen et al., 2019).

As might be expected from the social equity theory of relationship satisfaction, the division of labour after the birth of the child becomes an important factor influencing the relationship of the new parents. Working women without children already perform more household duties than men do, but after becoming mothers, the situation is exacerbated (Coltrane, 2000). Mothers assume more of the stereotypically female roles of performing household duties, such as laundry, cooking, and cleaning, in addition to providing the bulk of the child care. Men increase their involvement in paid employment outside the home after the child enters the family (Christiansen & Palkovitz, 2001).

This shift in family roles following the birth of the first child is called **doing gender**, a term that refers to the tendency of women and men to behave in stereotypically gendered ways. Parenthood sets up a dynamic that leads the parents to feel that they are now a "traditional" family (Vespa, 2009). For a couple who may have shared housework in a more egalitarian fashion before the child was born, this shift into gendered roles can place strain on the relationship (Grote et al., 2004). Even couples in commuter marriages, in which parents live apart together due to the demands of their jobs, may experience gendered role demands although it is possible that these situations also facilitate "undoing" of gender roles (Lindemann, 2017).

There are also variations in the TtP due to the availability of methods for same-sex married couples to have children through artificial insemination, adoption, or surrogacy. These couples share many of the experiences of heterosexual couples. However, the social context seems to have a significant impact on same-sex parents. Those who experience homophobia, live in jurisdictions with unfavourable legal climates regarding adoption by gay people, and receive less support from their friends and families are more likely to feel depressed and anxious (Goldberg & Smith, 2011). As their children grow older, parents may be able to find support through friendships with other parents of similar-age children in same-sex relationships.

Fatherhood is increasingly being studied as an aspect of identity in adulthood reflecting, in part, the increasing role of fathers in the raising of their children (Coles, 2015). Canada has 8.6 million fathers and almost half have children living with them (Battams, 2017). In addition, as indicated in Figure 9.9, men comprise 3.6 percent of lone-parent families. Overall, the gap between men and women in household work participation rate has narrowed from 42 percent in 1986 to 17 percent in 2015, and 39 percent of fathers indicated that they would prefer to be a stay-at-home parent. Being a stay-at-home father has increased from 2 percent of all families in 1976 to 11 percent in 2014. When interviewed, fathers say that they are more involved with their children than their own fathers were. Children are also more likely to say that they would talk to their father about things that bother them (Battams, 2017).

Becoming a first-time father can significantly influence a man's patterns of social interaction outside the home. A seven-year longitudinal study of nearly 3,100 fathers of children under the age of 18 described the "transformative" process that occurs as new fathers become more involved with their own parents, grandparents, and other relatives. Fathers also become more involved with service-oriented groups and church. These effects occur along with the birth of each child, but are particularly pronounced at the time of the first child's birth (Knoester & Eggebeen, 2006).

Men who feel that they will be better fathers during the TiP also become more involved in parenting. Moreover, the way that mothers perceive their husbands in the father role can help shape the way that fathers see themselves. A short-term longitudinal study of 183 Canadian couples studied over the first 18 months of first-time parenthood showed that the confidence that men had in their parenting was shaped by how competent their wives viewed them as fathers, which in turn shaped both their self-perceptions and their involvement with their infants (Tremblay & Pierce, 2011).

The extent to which a single father is able to adjust to the role of solo parent is affected by the characteristics of the children, including their age and gender, and his own characteristics, including his age and educational level. Overall, single fathers spend less time caring for their children than do single mothers, but more than do married fathers (Hook & Chalasani, 2008).

Changes in the family living situation in recent decades are often discussed in terms of **blended families**, also known as reconstituted families. Within these family situations, at least one adult is living with a child who is not a biological child of that adult. Often, these family situations develop after a divorce and remarriage (or cohabitation), in which two adults establish a household together. The dynamics within these relationships, though the subject of many fictional accounts, are only beginning to receive empirical attention in the literature. Research suggests that stepmothers experience more stress than biological parents, but that a relaxing of gender roles and higher relationship adjustment within the couple (i.e., stepparent and biological parent) can facilitate their adjustment (Shapiro, 2014).

The Empty Nest

We have examined the factors that influence the transition of a couple that occur when their first child is born. Now we will take a look at what happens during the reverse process. The **empty nest** describes the period in a couple's life that occurs when their children permanently depart from the home.

For many years, the common belief was that the empty nest would be an unwelcome change, particularly for women. However, the reality that the empty nest may be a positive step in a couple's relationship is becoming more and more apparent. Much of the research on the empty nest dates back to earlier decades, when women were less likely to maintain continuous employment outside the home than is currently true. Furthermore, much of the earlier research was conducted at a time when children were more clearly launched, as compared to the present, in which children often take longer to leave the parental home and may "boomerang" back when their economic circumstances take a turn for the worse. Many parents then, if not now, regard their children's leaving to be a mark of their success in preparing them for adulthood.

With the children gone from the home, couples potentially have the opportunity to enjoy more leisure-time activities together, a change that should bring them closer together. Being able to spend time with each other may also allow them to enjoy greater marital satisfaction, and also improved sexual relations. An intensive study of a small sample of Canadian women married after the age of 50 found a shift away from an emphasis on sexual intercourse to greater valuing of other expressions of intimacy, such as cuddling, companionship, and affection. These women still felt that they had strong sexual chemistry with their husbands, even though the expression of that chemistry had changed from the passion of youth (Hurd Clarke, 2006).

Perhaps for these reasons, the empty nest may have some advantages in helping keep a couple's sexual relationship alive. When children do return home for whatever reason, the quality of a couple's sexual relationship may decline, at least in terms of frequency of sexual activities. A survey of more than 15,000 mid-life Canadian women showed that the predictors of sexual activity within the past 12 months included age, marital status, race, income, alcohol use, smoking, and empty nest status (Fraser et al., 2004). Women whose children were still living in the home were less likely to have intercourse than women who were empty nesters.

However, among certain couples, the empty nest can pose challenges. Mitchell and Lovegreen (2009) identified a pattern they called the "Empty Nest Syndrome" (ENS) in an interview study they conducted of 300 empty nest parents from four cultural groups living in Vancouver, British Columbia. The interviews showed that mothers were slightly more likely than fathers to report ENS; however, the percentages of despondent parents were very low, ranging from 20 to 25 percent in most of the groups studied. Parents of Indo/East Indian ethnicity, whose culture emphasizes continuing bonds between parents and adult children, had far higher rates of ENS (50 percent and 64 percent for fathers and mothers, respectively) than parents of Chinese or southern European, or British ancestry.

In addition to the role of culture, the Vancouver study identified key social psychological factors that seemed to place these midlife parents at risk of experiencing ENS. These include having an identity that is wrapped up in their parent role, feeling that they are losing control over their children's lives, having few or only children, and lacking a support network. Parents who worried about their children's safety and well-being in the world outside the home were more vulnerable to ENS. For the most part, however, it's important to remember that the parents in this study were more likely than not to adapt well to the empty nest transition.

Although the empty nest is viewed as the norm when discussing adult children and their parents, there are, as indicated, a growing number of adult sons and daughters living with their parents, a situation referred to by the slang term "boomerang" children in the United States and "Kids in Parents' Pockets Eroding Retirement Savings" (KIPPERS) or "kidults" in the United Kingdom.

As is true for the empty nest, there is surprisingly little research on the dynamics of young adults who live in the home of their parents. One Canadian survey reported cultural differences in the tendency of parents and young adult children to live together, with Asian and Latin-American-born parents most likely to host their 20- to 24-year-old children (Turcotte, 2006). Parents with live-in children were more likely than parents whose children did not live at home to experience feelings of frustration over the time spent taking care of their adult children, but the percentage of these negative feelings was very low. The financial situation for college graduates who return home varies considerably from family to family and seems to play a role in the way parents and adult children renegotiate their relationships in view of these variations (West et al., 2017). One qualitative investigation suggests that these negotiations are successful and perceived as beneficial to both the boomerang children and their parents (Casares & White, 2018).

Parents and children transition together, then, over the course of their relationship, from the children's entrance into the home until their eventual exit, whether permanent or not. The dynamics of these relationships over time may be understood both in terms of identity and in terms of sociocultural factors. Many parents highly value their identities as parents, and therefore see the development of their children as reflections of their own competence. At the same time, children try to dissociate from their parents in order to establish their own identities. All of these changes happen in a sociocultural context, which, as we have seen in the empty nest research, may affect the normative expectations that parents and children have regarding their positions in the family. We will see later that the dimensions of intergenerational relationships are complex and multifaceted, reflecting these intersecting forces.

Parent–Adult Child Relationships

As children move through the years of adulthood, there are many facets of the relationship with their own parents that undergo change. For example, as children have their own families, they begin to gain greater insight into the role of being a parent. On the one hand, the children may now appreciate what their parents did for them, but on the other hand, they may resent their parents for not having done more. Another changing feature of the relationship stems from the children's increasing concern that parents will require help and support as they grow older. Adult children and their parents may also find that they do not agree on various aspects of life, from an overall philosophy and set of values (such as in the area of politics) to specific habits and behaviours (such as how to eat and dress). Whether parents and their adult children live in the same geographic vicinity and actually see each other on a frequent basis must also be added into the equation.

There are several key concepts that can help you gain insight into parent–adult child relationships. **Filial maturity** occurs when children reach the age of relating to their parents as equals. Achieving filial maturity means that you can share your thoughts and feelings with your parents, think of your parents as friends, and see yourself as having much in common with your parents (Birditt et al., 2008). **Filial anxiety** is the fear of having to take care of an aging, infirm parent (Cicirelli, 1988). **Filial obligation** describes the cultural values that adult children are expected to care for their parents, including having them live in their homes. Adult children who adhere to the value of filial obligation may believe that they can maintain both their work and family demands, but as caregiving hours increase, they find that they must reduce their time at work (Paulson et al., 2017). Filial obligation is also known as **filial piety** in China, represented by the character (*xiao*).

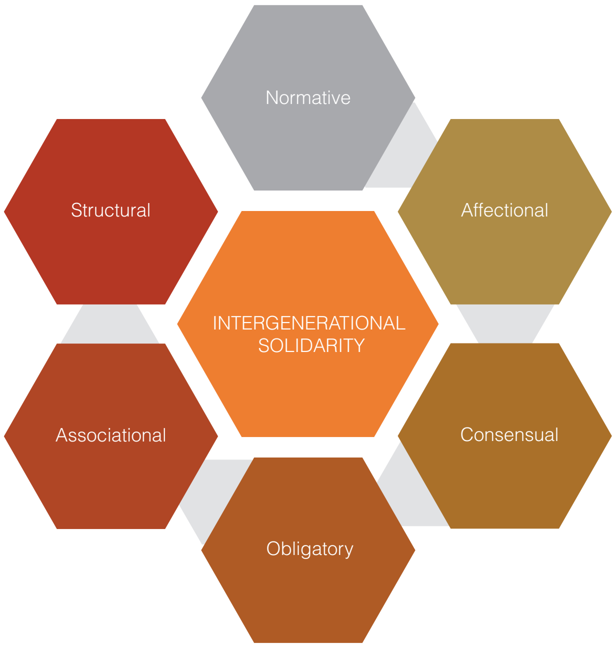
An overarching framework for understanding parent–adult child relationships comes from the **Intergenerational Solidarity Model (ISM)**, which proposes that six independent dimensions of solidarity characterize adult family relationships: associational (frequency of interaction), affectual (feelings), consensual (agreement in values, beliefs, and lifestyles), functional (help exchange), normative (commitment to fulfill family obligations), and structural (availability in terms of distance and health) (see Figure 9.11).

Each of the ISM dimensions runs along a continuum from positive to negative. For example, the positive pole of the affectual dimension would describe families high in intimacy, and the negative pole would capture families that are emotionally distant. These poles apply to the family as it exists, not to the satisfaction or dissatisfaction that the family may have with where their family ranks on the dimension. A family may see each other only relatively infrequently (i.e., be low on the associational dimension) but not be dissatisfied if they prefer not to see each other very often (Bengtson et al., 2002). Think about your family and how you would rate the way you get along with parents, siblings, cousins, or others you include as relations. Do you feel emotionally connected (affectional) or are your bonds limited to the minimum that's expected of you (obligatory)? Is it important for you to act like the "perfect" son, daughter, niece, or nephew (normative)? How do you and your family get along when you sit down to a holiday meal? Do you all avoid talking about politics to avoid disagreements (consensual)? As you can see, the ISM provides a useful way to understand families not only in a theoretical sense but also in a way that applies to your own everyday experiences.

As you thought about your family, it might make sense that as your family changes, so does the way you relate to each other. However, some of those basic structural factors seem to be enduring. Indeed, an 18-year study of families showed that there is more continuity than change in the dynamics of intergenerational relationships over time (Hogerbrugge & Silverstein, 2015).

FIGURE 9.11

Intergenerational Solidarity Model



According to the intergenerational solidarity model, relationships can be defined along six dimensions.

Although it is possible that your family relationships are always harmonious, it is more likely that there are occasional rifts or bad feelings. Some of these difficulties stem, according to the family relations literature, from a lack of clear norms to guide your interactions. **Structural ambivalence** in family relations means that society's structures do not make clear how family members should behave (Connidis & McMullin, 2002). Family members then face contradictory sets of expectations based on such factors as their age and their gender. The uncertainty they face may then produce psychological ambivalence, in which an adult child feels both love for and annoyance at a parent.

Tensions between parents and their adult children can increase the extent to which they experience ambivalence, which in turn lowers their affectual solidarity (Birditt et al, 2009a). According to some researchers, these tensions are almost automatically built into the parent–adult child relationship by virtue of the fact that the parents are more emotionally invested in their children than children in their parents. The **intergenerational stake hypothesis** proposes that parents are higher in affectual solidarity towards their children than children are towards their parents. In other words, parents feel more positively about their children than their children do about them. Consequently, parents are likely to try to resolve conflicts with their children through methods that are as constructive as possible (Birditt et al., 2009b).

Although originally proposed as a feature of parents and their adult children only, the intergenerational stake also applies to three-generation families. Grandmothers report lower negative quality in their relationship than do their middle-aged children, who, in turn, report lower negative quality in the relationship than do their own children (Birditt et al., 2012).

Parents and their adult children also differ in their developmental needs, resulting, in some cases, in another set of intergenerational tensions. The **developmental schism** occurs when there is a gap between the two generations in how much they value the relationship and whether they wish to be independent (Fingerman, 2001). One manifestation of the developmental schism is the mother's tendency to regard her daughter as more important than the daughter does the mother, and for the daughter to regard the mother as more intrusive than the mother does the daughter. Mothers are also more likely to regard their daughters as confidants than daughters do their mothers.

Another contributor to the developmental schism occurs when the daughter still seeks the approval of the mother and feels guilty when she feels that she is not living up to her mother's expectations for her. Because of intergenerational stake, when conflicts occur parents are more likely than their children are to try to resolve conflicts using constructive strategies in which they attempt to maintain and build a positive relationship (Birditt et al., 2009b). Despite these problems, the majority of adult children (56 percent) state that they feel close to their parents. Another large group (38 percent) see their relationship as ambivalent. Fortunately, only a small minority (6 percent) see it as problematic (Fingerman et al., 2004).

For older adults, adult parent–adult child relationships can play a vital role in well-being, particularly with regard to the development of generativity, and particularly for women (An & Cooney, 2006). Aging parents who have good relationships with their adult children are less likely to feel lonely or depressed (Koropeckyj-Cox, 2002). Interestingly, perceptions of relationships with adult children may even influence the exercise and smoking habits of parents (Thomas et al., 2019).

Part of the intergenerational stake involves concern over the welfare of one's children. When their children succeed, parents can benefit in life satisfaction and well-being; when problems befall their children, parents can suffer ill consequences as well. In a longitudinal study carried out in the Netherlands, Kalmijn and colleagues (2012) found that the divorce of children produced an increase in depressive symptoms among parents, particularly for mothers. On the other hand, when children married and became parents, their own parents also showed a boost in feelings of well-being.

The intergenerational stake hypothesis proposes the opposite to the concept of **role reversal**, which refers to the family situation in which adult children take over in the role as parent because the parents are unable to care for themselves. Although this is a term we hear about in the popular literature, the data on intergenerational support present a more complicated picture (Blieszner, 2006), suggesting that much of the flow is downstream from parents to children.

Further reinforcing the inaccuracy of role reversal is **contingency theory**, which proposes that parents help their adult children who need it most, particularly in a financial sense. A survey of over 600 middle-aged adults showed that most parents indeed were more likely to provide help when their adult children experienced a crisis. Fewer middle-aged adults reported assisting their own parents, again primarily in crisis situations (Fingerman et al., 2010). Moreover, when parents do experience declines in health, it seems that the norms of filial responsibility lead to mutual adaptations between children and parents (Silverstein et al., 2006).

It appears that the majority of middle-aged adults are able to balance the need to help both their own children and their parents. Another popular idea regarding middle-aged adults is that they are in the **sandwich generation**, meaning they are sandwiched between their aging parents and teenaged children. As we saw in Chapter 5, there can be risks experienced by middle-aged adults who serve as caregivers, at least for the time that they are engaged in these roles. In a large longitudinal study of nearly 5,000 Midwest adults, researchers found that both men and women who were multigenerational caregivers were less likely to engage in a range of healthy behaviours, from using a seat belt, to choosing healthy foods based on their content, to smoking (Chassin et al., 2010).

A relatively recent trend in parenting literature describes the behaviour of **helicopter parents**, those supposedly smother and overprotect their overly dependent children (regardless of the age of the child). As we have seen, middle-aged parents are likely to provide whatever support they can to adult children who are in need of financial help. Moreover, parents benefit from their relationships with their adult children as do children from their relationships with parents. The question is: How much is too much?

Fingerman and colleagues (2012) interviewed middle-aged parents with at least one child over the age of 18 and also interviewed up to three of their children. Both parents and children rated the extent of support and indicated whether the amount provided was too little or too much. Approximately one-fifth of children and nearly 30 percent of parents reported "intense" support (i.e., too much). However, rather than being detrimental to the child's well-being, young adults whose parents provided a wide range of support ranked higher in life satisfaction. Their parents did not particularly suffer from the support they provided unless they thought their children needed "too much" support, perhaps reflecting what they perceived as their own failure to live up to the ideal identity of a parent.

Clearly, the area of parent–adult child relationships reflects many complex and interacting factors. From a biopsychosocial perspective, we can understand these relationships as involving biological processes pertaining to the aging and health of parents; psychological processes relating to areas such as emotions, identity, and closeness; and social expectations for normative parent–child relationships in one's culture and historical era.

Siblings

The sibling relationship has many unique features within the constellation of family interactions (Van Volkom, 2006). Those who are siblings by birth share a genetic background; those who have been raised together share many experiences dating to early childhood. By the time siblings reach later adulthood, it is quite possible that they are the only remaining members of their original family and have known each other longer than anyone else they have known in their entire lives. As is true for adult child–parent relationships, the sibling relationship is not one of choice; to be sure, many people allow their connections with brothers and sisters to fall by the wayside. However, even if they do not stay in frequent contact, they may still maintain the relationship and tend to value it in a positive manner (Bedford et al., 2000).

The potential exists for the sibling relationship to be the deepest and closest of an adult's life and to bring with that closeness both shared joy and shared pain. On the negative side, individuals can carry into adulthood long-standing resentment towards the sibling or siblings they felt received more attention from the parents (Suitor et al., 2009). They will feel better towards each other if their parents fostered warm and affectionate relationships that included equal treatment of the siblings (Volling, 2003). In contrast, if their parents were equally unsupportive, the siblings may turn to each other to compensate for the poor treatment they received as children (Voorpostel & Blieszner, 2008).

Though obviously important to well-being throughout adulthood, the sibling relationship remains poorly understood in part because there are so many variations to factor into the findings, including age differences, gender, and, most recently, the complex relationships that can exist among blended families.

Grandparents

For many older adults, the rewards of family life begin to grow much richer when they reach the status of grandparents. At this point, they are in a position to enjoy the benefits of expressing their generativity through interacting with the youngest generation. At the same time, grandparents can avoid the more arduous tasks of parenthood.

Many people still think of grandparents as the warm, generous, older adults portrayed in storybooks: kindly relatives who have ample time to spend with their families and want to do so. However, variations in patterns of grandparenting, along with a rapidly increasing growth in the number of grandparents in the population, may require a change in this image.

As indicated in the infographic in Figure 9.12 grandparents are important part of Canadian families (Statistics Canada, 2019j). The number of grandparents has grown in Canada and they are older. In 2017, the average age of grandparents was 68 years and almost 8 percent of grandparents were age 85 and older, compared to 3 percent in 1995. Interestingly, 21 percent of grandparents were born outside of Canada, a reflection of the cultural diversity across Canada. Often foreign-born grandparents are more than twice as likely to live with their family members and they take an active role in child care and family life. Overall in Canada, 5 percent of grandparents live with their grandchildren (Battams, 2019).

As indicated in Figure 9.12, indigenous grandparents are younger with a mean age of 63, five years younger than the national average. This is consistent with the fact that Aboriginal peoples are a young population. Approximately 1 in 6 children aged 0 to 4 shares a residence with a grandparent in Aboriginal communities (Statistics Canada, 2017d). This reflects the importance of extended family, the economic benefits of shared housing, and housing shortages. Living together provides important opportunities for sharing the traditions, values, and languages of Aboriginal peoples across generations.

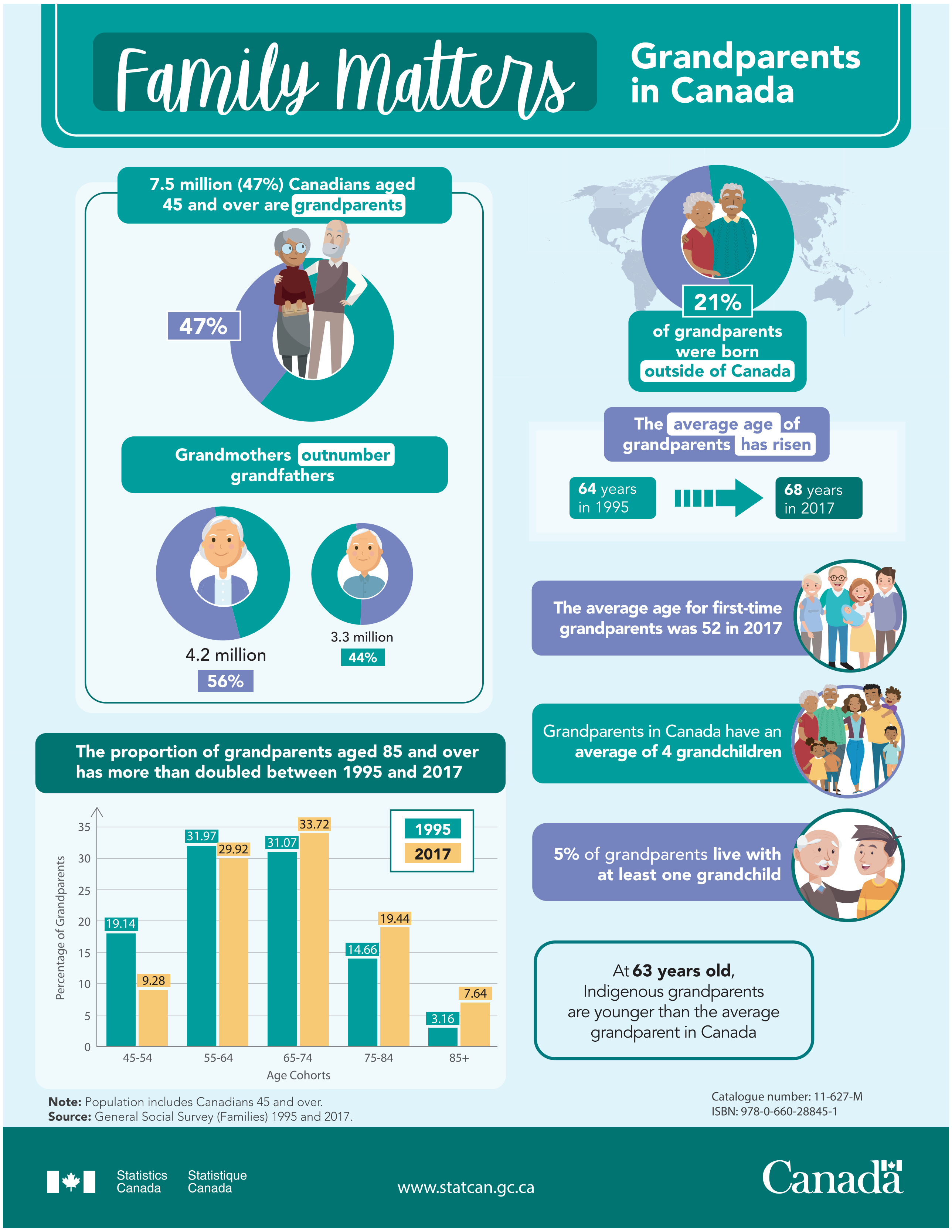
The term **skip-generation family** refers to the family living situation in which children live with their grandparents and not their parents. The skip-generation family is often related to parental substance abuse. As you saw in Figure 9.9, 0.6 percent of grandparents are responsible for grandchildren with whom they reside. In Canada, First Nations groups are vastly overrepresented in skip-generation households. These grandparents provide care in the face of high rates of poverty, disability, and multiple competing demands. In 2016, 1.8 percent of Aboriginal children age 0 to 4 were living in skip-generation family, in contrast to 0.3 of non-Aboriginal children. This was most common in First Nations groups (2.2 percent) and less common among Métis (0.9 percent) (Statistics Canada, 2017d).

Grandparents vary in the extent to which they become involved in the lives of their grandchildren. The classic study of grandparenting conducted by Neugarten and Weinstein (1964) identified five types of grandparents. The first type, the formal grandparent, follows what are believed to be the appropriate guidelines for the grandparenting role. Formal grandparents provide occasional services and maintain an interest in the grandchild, but do not become overly involved. By contrast, the second type, the fun-seeker, prefers the leisure aspects of the role and primarily provides entertainment for the grandchild. The surrogate parent is the third type and as the name implies, takes over the caretaking role with the child. Fourth, the reservoir of family wisdom, which is usually a grandfather, is the head of the family who dispenses advice and resources but also controls the parent generation. Finally, the distant figure is the fifth type; he or she has infrequent contact with the grandchildren, appearing only on holidays and special occasions.

Other attempts to characterize or delineate styles or categories of grandparenting have followed a similar pattern, with distinctions typically being made among the highly involved, friendly, and remote or formal types of grandparents (Mueller et al., 2002). The "remote-involved" dimension is one that seems to resonate in the attitudes that grandchildren have towards their grandparents as well (Roberto, 1990). The symbolic value of the grandparent in the family lineage, or the "family watchdog" (Troll, 1985), is another central component identified in several classifications.

Although these variations may exist in patterns of grandparenting, it is safe to say that the role of grandparent is an important one for the older adult and that grandparent identity is an important contributor to well-being (Sheppard & Monden, 2019). Grandparents feel a strong sense of connection to the younger generation (Crosnoe & Elder, 2002) and may play an important role in mediating relationships between parents and grandchildren during conflicts (Werner et al., 2005). Spending some time watching grandchildren may also help improve an older adult's executive functioning (Burn & Szoeke, 2015). Think about the times you introduced a grandparent to new

FIGURE 9.12



Family Matters

Grandparents in Canada

7.5 million (47%) Canadians aged 45 and over are grandparents

47%

Grandmothers outnumber grandfathers

4.2 million
56%

3.3 million
44%

The proportion of grandparents aged 85 and over has more than doubled between 1995 and 2017

21% **of grandparents were born outside of Canada**

The average age of grandparents has risen

64 years in 1995

68 years in 2017

The average age for first-time grandparents was 52 in 2017

Grandparents in Canada have an **average of 4 grandchildren**

5% of grandparents **live with at least one grandchild**

At **63 years old,**
Indigenous grandparents are younger than the average grandparent in Canada

Note: Population includes Canadians 45 and over.
Source: General Social Survey (Families) 1995 and 2017.

Catalogue number: 11-627-M
ISBN: 978-0-660-28845-1

Statistics Canada Statistique Canada

www.statcan.gc.ca

Canada

Source: Statistics Canada. (2019j). Family matters: Grandparents in Canada. Retrieved from https://www150.statcan.gc.ca/n1/en/pub/11-627-m/11-627-m2019001-eng.pdf?st=mEifLVUg technology or shared the latest news from the entertainment world. Through younger-generation family members, grandparents can gain an understanding of everything from the latest music to the newest video games.

As you can probably attest to from your own life, contact with grandchildren declines steadily through the grandchild's early adulthood, particularly when they leave the home of their parents and start an independent life of their own (Geurts et al., 2009). Those grandparents who get along with their own children are more likely to maintain contact with their grandchildren throughout this period (Dunifon & Bajracharya, 2012). Research shows that such contact may be important to the mental health of the older generation. Grandparents who are unable to maintain contact with their grandchildren due to parental divorce or disagreements within the family are likely to suffer a variety of ill consequences, including poor mental and physical health, depression, feelings of grief, and poorer quality of life (Drew & Smith, 2002). However, as their grandchildren get older, many grandparents are able to stay in touch and even to consider their grandchildren as part of their social network (Geurts et al., 2012).

FRIENDSHIPS

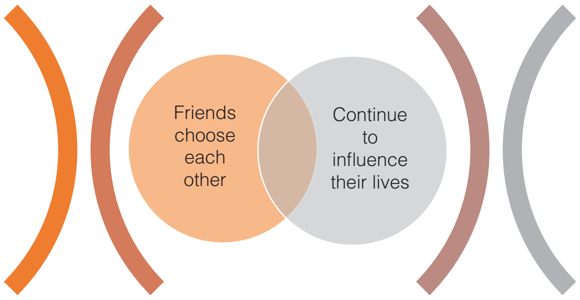
Of the areas of relationships examined in this chapter, oddly enough, friendship has probably received the least attention regarding its function, meaning, and changes over the course of adulthood. Yet, everyone can attest to the importance of friends in their own life, and the many roles that friends play in providing various forms of support and boosting one's emotional well-being.

Theoretical Perspectives

From a life course perspective, the major dimension that underlies close friendships is reciprocity, or a sense of mutuality (Hartup & Stevens, 1997) (see Figure 9.13). The fundamental characteristic of reciprocity is that there is give-and-take within the relationship at a deep emotional level, involving intimacy, support, sharing, and companionship. At the behavioural level, reciprocity is expressed in actions such as exchanging favours, gifts, and advice.

FIGURE 9.13

Reciprocity Is Key Dimension of Friendships



Friendships are characterized by reciprocity throughout life.

Close friends in adulthood confide in each other, help each other in times of trouble, and attempt to enhance each other's sense of well-being. Although there may be developmental differences across the life span in the expression of reciprocity, the essence of all friendships remains this sense of deep mutuality. Another important function of friendships is socializing, or helping each other through life transitions in other spheres, such as changes in health, marital relationships, residence, and work.

Patterns of Friendships

Although people's lives change substantially through the vicissitudes of adulthood, many people remain close to their "best" friends. According to a 2002 survey (Fetto, 2002), 65 percent of adults have known their best friends for at least 10 years, and 36 percent for 20 years or more. Nearly all (91 percent) said they would take a vacation with their best friend.

This tendency to stick with their best friends occurs despite the pressures of people's jobs, children, and romantic partners. In fact, as people enter long-term intimate relationships, many engage in **dyadic withdrawal**, which is the process of reducing the individual friendships of the couple and increasing the joint friendships (Kalmijn, 2003). Overall, this means a decline will occur in a person's total number of friends. On the other hand, as couples share social networks, they expand their own friendship circles and also strengthen their own relationship (Cornwell, 2012). Part of this may occur through "platonic couple love," in which couples who are best friends also emulate the desirable qualities of the other couple (Greif & Deal, 2012).

Friendship patterns at any age may be seen as following a developmental trajectory from formation to dissolution (Adams & Blieszner, 1994). You have probably experienced this trajectory with your own friends. The stage of friendship formation involves moving from being strangers to acquaintances to friends. The maintenance phase encompasses what is usually thought of as "friendship," during which friends sustain an active interest and involvement with each other. They may evaluate the quality of the friendship periodically during this phase, deciding to increase or decrease their level of involvement. In terms of Hartup's framework, it would be during the maintenance phase that reciprocity levels are highest. Friendships may remain in the maintenance phase for years, even decades, at varying levels of closeness. The end of a friendship, which occurs during the dissolution phase, may be hard to identify. A friendship may end gradually over a period of time as feelings of reciprocity dwindle and the relationship essentially falls by the wayside. Friendships may also end through a conscious decision based on insurmountable disagreements and conflict.

Friendships in adulthood may also be distinguished in terms of the closeness of the relationship, which may or may not change over time. People may maintain **peripheral ties**, which are not characterized by a high degree of closeness, for many years (Fingerman & Griffiths, 1999). Peripheral ties include people such as neighbours, co-workers, professional contacts, gym buddies, friends of friends, or the parents of one's children's friends. These relationships may be amicable and cordial but never progress beyond this level. Other peripheral ties may be those that are in the friendship formation stage and will later progress to close friendships. A third type of peripheral tie is one that was formerly a close friendship and has now moved to the dissolution/disinterest stage.

There may also be variations in friendship patterns in adulthood based on individual differences in approaches towards friends, called **friendship styles** (Miche et al., 2013). Individuals who have an independent friendship style may enjoy friendly, satisfying, and cordial relationships with people but never form close or intimate friendships. The type known as discerning individuals are extremely selective in their choice of friends, retaining a small number of very close friends throughout their lives. Finally, people with an acquisitive friendship style are readily able to make and retain close friendships throughout their lives and therefore have a large social network.

Throughout adulthood, close social ties serve as a buffer against stress and are related to higher levels of well-being and self-esteem. Relationships with friends may also serve as important buffer against late-life stresses (Huxhold et al., 2014). Having frequent contact with friends may even help older adults maintain better memory (Zahodne et al., 2019). Moreover, friendships play a particularly important role in the lives of older gay men and lesbians, who have considerably more elaborated conceptions of their friendship ties than do heterosexual individuals (De Vries & Megathlin, 2009).

Friends are an important influence on you throughout your life. Although you may not realize it, they contribute to your personal narratives, sense of self, and even important life choices (Flora, 2013). The nature of your friendships may change over time, but they continue to serve as a source of self-definition and support.

As you have learned in this chapter, close social ties play an important role in development. Even as relationships respond to a changing social context, they continue to influence people's well-being and adaptation. There continue to be areas of research that need further work, however, particularly in the areas of grandparenting, siblings, and friendships. From a biopsychosocial perspective, this research will provide greater understanding of the interactions among health, personality, and social context.

SUMMARY

1. Close relationships form an important component of adult life. Development in adulthood and later life interacts in important ways with the ties that people have with others. Societal changes impact the nature of individual relationships. The large majority of adults get married, and although marriage rates are decreasing and people are waiting longer to get married than in previous decades, the majority of adults are living in a marital relationship.
2. Cohabitation rates have been increasing in recent decades. According to the cohabitation effect, people living together before marriage are more likely to divorce unless they become engaged prior to cohabitation.
3. With the legalization of same-sex marriages, there has been increased attention to the nature of same-sex families. Not only are the numbers of marriages increasing but so are the numbers of children of LGBTQ parents.
4. Birth rates in Canada are decreasing in younger women but have increased among older mothers.
5. Widowhood is a stressful event for men and women; although increased mortality is associated with widowhood, the majority of those who are widowed maintain their resilience. The widowhood effect refers to the higher rates of mortality in widowed individuals.
6. Studies of the TtP indicate that decreases in marital satisfaction are especially likely to occur when the division of labour assumes more traditional lines in the household. The study of parent–adult child relationships reveals a number of important phenomena related to changes in roles and their altered views of each other. Important concepts in adult child–parent relationships include filial maturity, filial anxiety, and filial obligation as well as developmental schism and intergenerational stake. The intergenerational solidarity model proposes six dimensions to characterize the cohesiveness of these relationships.
7. Siblings are another important family tie in adulthood. Closeness between siblings varies over the adult years and can be affected by the way the siblings were raised by their parents.
8. The majority of older adults are grandparents, a relationship that tends to be positive. There is a trend towards grandparents raising grandchildren in a "skip generation" (no parents present) household. Theoretical explanations of grandparenting focus on the remote-involved dimension, and various categorization schemes are based on this concept. Grandparenthood is an important source of life satisfaction.
9. Friendships are another source of important close relationships in adulthood, and even if individuals are not involved in close-knit friendships, they may have many important peripheral ties. Friendships can potentially have positive benefits on cognition.

10

Work, Retirement, and Leisure Patterns

What are older workers really like? See whether these statements are fact or myth! Check your answers on the next page.

AGEFEED

FACT?

MYTH?

OLDER WORKERS:

1. take more sick days than younger workers.
2. try hard to get a task done right the first time.
3. are less flexible than younger ones.
4. can be easily replaced by younger ones.
5. learn new skills to stay competitive in the workplace.
6. are not as productive as younger ones because they're just waiting to retire.
7. are a good fit to start-up companies.
8. aren't worth hiring because they'll just retire soon after starting.
9. are team players.
10. are more expensive than younger ones.

AGEFEED

...the facts

about older workers

1. take more sick days than younger workers.
   Myth! Older workers tend to have better regular job attendance than younger ones.
2. try hard to get a task done right the first time.
   Fact! While older workers may not work as quickly, they strive to get the tasks done right the first time without any mistakes. Speed does not always produce the best results!
3. are less flexible than younger ones.
   Myth! Older workers may be more likely to question changes, but they are just as likely as younger workers to adapt if the changes are well reasoned.
4. can be easily replaced by younger ones.
   Myth! The workplace knowledge and expertise gained by older workers is often very difficult to replace and can take years to develop.
5. learn new skills to stay competitive in the workplace.
   Fact! Many take courses to enhance their skills helping to keep up with changing technologies or practices.
6. are not as productive as younger ones because they're just waiting to retire.
   Myth! Evidence suggests that older workers are just as productive as younger ones.
7. are a good fit to start-up companies.
   Fact! The experience older workers bring to new companies can be valuable, particularly in times of uncertainty.
8. aren't worth hiring because they'll just retire soon after starting.
   Myth! Older workers stay at a job longer than younger ones, who may view jobs as stepping stones.
9. are team players.
   Fact! With experience comes a better understanding of one's strengths and weaknesses, which can be invaluable in a team setting.
10. are more expensive than younger ones.
    Myth! With older workers, costs are lower for hiring, retention, training, and on the job accidents.

The majority of adults are involved in productive activities in some form of paid employment. For people who are fortunate enough to be in a job they enjoy, the experience of work is positive and fulfilling and allows them to express their personal interests and abilities. Other workers view their job primarily as a means of supplying income that enables them to support themselves and most likely their families. Yet others struggle to balance their worklives with family obligations, perhaps requiring two jobs to stay afloat.

Whatever a person's current job situation, work provides the primary focus of his or her life. Work will dominate your life from your 20s onward, until either you retire or become too ill to continue. The type of job you have, the amount of money you make, and the conditions in which you work carry over to virtually every other area of your life. If you're like many people, part of your identity will be defined by your job title, prestige, security, and status.

In this chapter, we will talk about work in terms of vocational development, satisfaction, and performance. We will conclude the chapter with an extensive look at how retirement affects people in terms of their finances, life satisfaction, and leisure pursuits. Although the thought of retirement may seem very far away to you now, as you will learn, it's never too early to start planning for it. Before we get to that section, however, we'll explore the ways that you can lead a fulfilling work life.

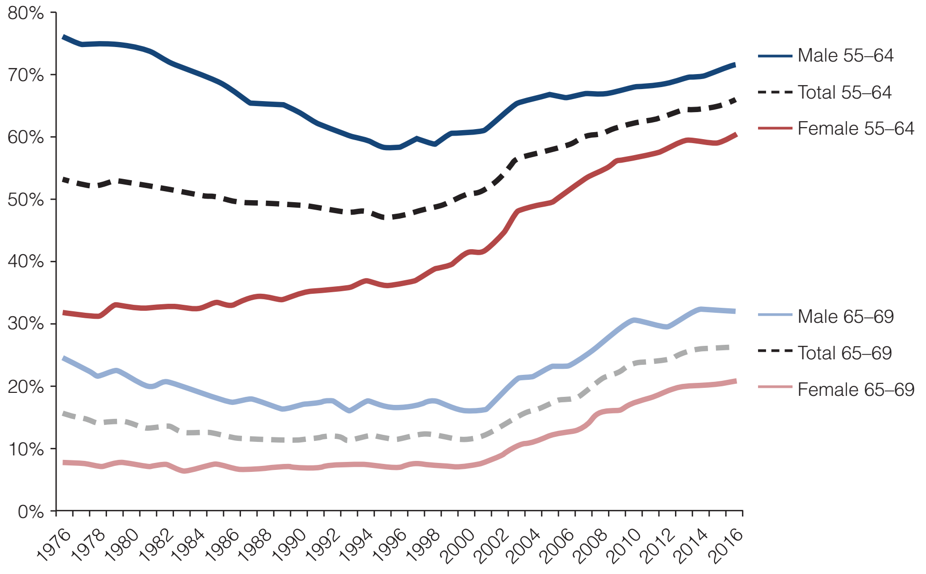
WORK PATTERNS IN ADULTHOOD

We will start with some basic concepts and statistics about work before we explore the psychological aspects of work in adulthood. The **labour force** is defined by Statistics Canada as the percentage of the population, 15 years and over, who did any work at all (including unpaid family work, for example, on a family farm) or had a job but did not work due to illness or disability, personal or family responsibilities, vacation, or labour dispute (Statistics Canada, 2020b).

In 2017, Canada's labour force participation rate was 66 percent; however, this is projected to decrease to 63 percent or less in 2036, primarily due to population aging (Martel, 2019). The last of the baby boomers will be 65 in 2030. While 65 is typically the age we think about as retirement age (in part because that is when you can begin receiving the Old Age Security pension), many older adults continue working after age 65. About half of these older adults do so out of necessity, to pay for essential expenses (Hazel, 2018).

As you can see from Figure 10.1, rates of labour force participation increased from 1976 to 2016 among those age 55 to 64 and age 65 to 69, with the largest increases among women. This pattern is due to an increase in the age of retirement, from a low of 60.9 years in 1998 to 63.6 years in 2016, and the trend towards returning to the workforce after retirement (Employment and Social Development Canada, 2018). However, older Canadians face obstacles when trying to stay in the labour force or find new employment. These include ageism; lack of education and training; difficulty finding and applying for jobs; health issues, work–life balance and the absence of workplace accommodations; and lack of incentives or disincentives to stay in the retirement income system (Employment and Social Development Canada, 2018).

Block et al. (2019) compared employment rates between racialized and non-racialized Canadian men and women. In 2016, racialized groups made up 22 percent of the Canadian population. Over 70 percent of racialized groups are South Asian, Chinese, Black, or Filipino. There is significant economic disparity between racialized and non-racialized groups. Racialized women have the highest rates of unemployment



Note: Labour force statistics by detailed age group are not available for the Territories.

FIGURE 10.1

Participation Rate of Older Individuals, by Gender and Age Group (Canada, 1976 to 2016)

The increasing rates of labour force participation among men and women age 55–64 and 65–69.

Source: Employment and Social Development Canada. (2018). *Promoting the labour force participation of older Canadians*. Ottawa, ON: Government of Canada. Retrieved from https://www.canada.ca/en/employment-social-development/corporate/seniors/forum/labour-force-participation.html at 9.6 percent, followed by racialized men (8.8 percent), non-racialized men (8.2 percent), and non-racialized women (6.4 percent). Similarly, racialized men and women earn 78 cents and 59 cents, respectively, for every dollar earned by non-racialized men. This persistent pattern of inequality is consistent over other financial indicators, for example, investment income, capital gains, and family income. Block et al. (2019) concluded that labour market discrimination is both racialized and gendered. Examining patterns of immigration, non-racialized immigrants fare better in the labour market than racialized immigrants and they do so sooner. Unfortunately, income inequality between racialized and non-racialized Canadians continues among second and third generations of immigrants to Canada. Block et al. (2019) refer to these race-related economic disparities as the "colour coded labour market" that is persistent in Canada, as shown by the analysis of census data over time. They urge researchers and policy makers to examine more closely the issue of labour market discrimination, with the goal of understanding and overcoming the entrenched barriers that racialized men and women encounter.

The gap in labour force participation rates between Aboriginal and non-Aboriginal Canadians is about 4 percent, with Aboriginal Canadians having lower rates. This has remained stable between 2006 and 2016. The lowest labour force participation rate is among Aboriginal people living on-reserves, and this gap has widened over the 10-year interval. Métis have the highest labour force participation rates that exceed non-Aboriginal Canadians (The National Indigenous Economic Development Board, 2019).

People with less education are more likely to be unemployed than people with more education. In 2019, Statistics Canada (2019n) reported that the unemployment rate was 8 percent for those without a high school diploma, 5.8 percent for those with a high school diploma, and 3.9 percent for those with a university degree.

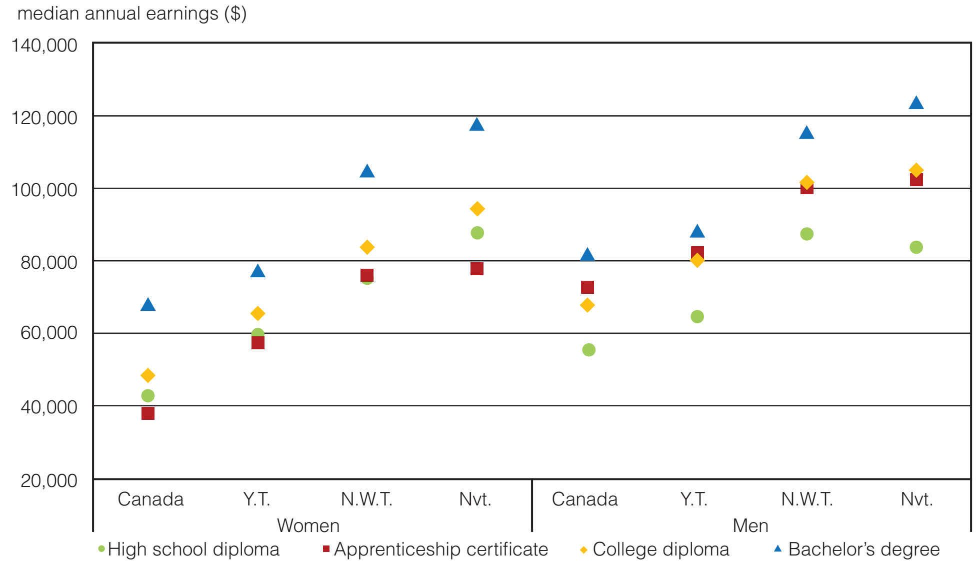
In addition, a Statistics Canada (2017e) report asks the question, does education pay? In fact, the data clearly indicate that it does, but the pattern is somewhat different for men versus women. Figure 10.2 indicates the median annual earnings of those age 25 to 64, by highest level of education in Canada and the territories in 2015. As you can see, those with a Bachelor's degree had higher earnings. However, what is noteworthy is that men with an apprenticeship certificate did very well, earning about $10,000 less than men with a Bachelor's degree in Canada (overall). The Canadian government has implemented opportunities and incentives to increase the number of workers in skilled trades. As a result, the percentage completing an apprenticeship in a skilled trade has increased from 4.9 percent in 2006 to 7.8 percent in 2016. The most common trade is electricians; however, the trade with the highest salary was "instrumentation technology," where workers earned $130,182.

Unfortunately, these same gains are not evident for women with apprenticeship certificates, in part because the apprenticeship certificate is in areas such as "hairstyling." Women with Bachelor's degrees had 58 percent higher incomes than women with a high school diploma, and 41 percent higher than those with a college diploma. Over the past decade, the earnings of a woman with a Bachelor's degree increased by 11 percent. As you can see from Figure 10.2, earnings of men and women in all educational categories are higher in the territories, compared to Canada overall.

Unfortunately, there are significant disparities in median income between Aboriginal and non-Aboriginal Canadians,

FIGURE 10.2

Median Annual Earnings of Women and Men Aged 25 to 64 Who Worked Full Time and Full Year as Paid Employees, by Highest Level of Education, the Territories and Canada Overall, 2015

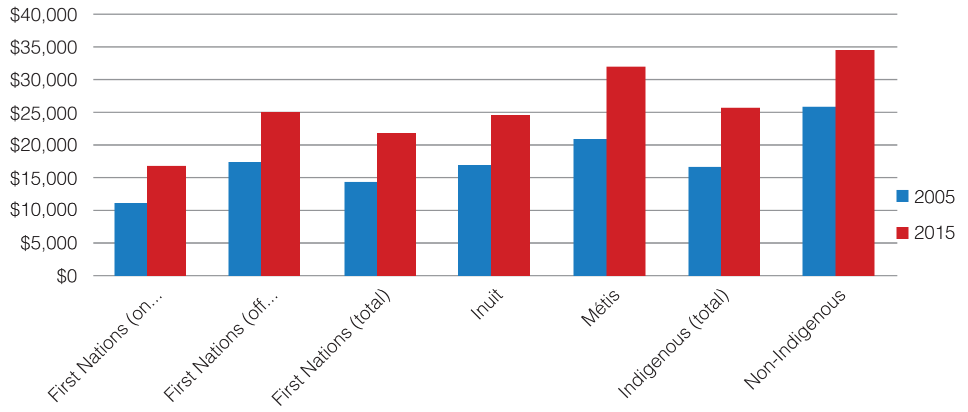


The median annual income of men and women at different levels and types of education.

Source: Statistics Canada. (2017e). *Does education pay? A comparison of earnings by level of education in Canada and its provinces and territories.*(Catalogue no. 98-200-X2016024). Ottawa, ON: Author. Retrieved from https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016024/98-200-x2016024-eng.pdf

FIGURE 10.3

Median Income (15 Years and Older) by Identity Group, 2005 and 2015, Canada



Indigenous Canadians have lower median incomes; however, there is significant variability across Indigenous identity groups.

Source: The National Indigenous Economic Development Board. (2019). *The Indigenous Economic Progress Report*. Retrieved from http://www.naedb-cndea.com/wp-content/uploads/2019/06/NIEDB-2019-Indigenous-Economic-Progress-Report.pdf

after controlling for age and education (Aboriginal Affairs and Northern Development Canada, 2013). A comparison of the two groups on income and earnings revealed gaps in the range of 10 to 20 percent of women and 20 to 50 percent for men. This gap is evident for even the most highly educated Aboriginal groups. For example, among those with a certificate or diploma below the bachelor level, the median income was $23,161 for non-Aboriginal Canadians and $16,025 for Aboriginal Canadians. This difference is smaller for those with bachelor's degrees (approximately $2,000), but larger again for those with education beyond the bachelor level (approximately $7,000) (Berger & Parkin, 2009). As you can see from Figure 10.3, median incomes vary considerably between those living on- and off-reserve, and by identity group. These patterns have remained quite stable over time (The National Indigenous Economic Development Board, 2019).

As of July 1, 2019, 61.2 percent of Canadian women were in the labour force compared to 70.3 percent of men (Statistics Canada, 2020d). This percentage has increased significantly over the past three decades. However, in 2017 less than 20 percent of women were in leadership roles, for example, on boards of directors, across industries (Statistics Canada, 2020g). This is in spite of the fact that Canadian women have increased their educational attainment significantly. Between 1996 and 2016, the number of Canadian women with bachelor's degrees and more advanced degrees, rose by 147 percent and 200 percent, respectively. During the same period, the number of female business graduates at the master's level rose from 39.8 percent to 50.5 percent (Employment and Social Development Canada, 2019).

However, women still earn less than men, a fact referred to as the **gender gap**, expressed as a proportion of women's to men's salaries. Pelletier et al. (2019) investigated the gender wage gap in Canada from 1998 to 2018. As indicated in Table 10.1, average real hourly wages grew 20.5 percent for women and 12.9 percent for men over the 20-year interval. This reduced the gender wage gap by 5.5 percent.

Pelletier et al. (2019) also examined the factors that decreased or increased the wage gap over the 20 years. The most important factor was occupational distribution. It was responsible for about one-quarter of the narrowing of the wage gap with more women employed in professional roles in law and social, community and government services; education services; and business and finance. Other important factors that accounted for the narrowing of the gender gap were women's higher educational attainment and the trend towards women working full-time (as opposed to part-time) in larger firms (more than 500 workers) and in public sector jobs. Larger firms tend to pay better and public sector earnings increased for workers over the 20-year interval. In addition, men were less likely to have union or collective agreement coverage over the time period and because union coverage is associated with higher wages, this too accounted for some of the narrowing of the gender gap in wages. There were also factors that widened the gap, most notably the greater representation of men employed in the high-paying construction sector, which grew appreciably over the 20-year time period.

VOCATIONAL DEVELOPMENT

Vocation is a person's choice of occupation. It reflects the individual's personal preferences and interests. Theories of vocational development propose that vocational choices and experiences change over time, reflecting their own interests and desires within the workplace.

Thinking about your own desire to enter a given field, it is likely that you have chosen your career path and hence your university major because of your vocational interests. You decided at an earlier point in your life that you wanted to pursue a given field, whether it was music, psychology, nursing, or social work because it suited your personality, values, and skills. These are the factors that vocational development theories take into account when they attempt to explain the career choices

TABLE 10.1

Wages and Wage Gap for Core-Aged (25 to 54) Employees, 2018 Constant Dollars, 1998 to 2018

	Average real hourly wages	**Average real hourly wages**	**Wage gap** [1]	**Wage gap** [2]
	Men	Women		
	dollars		dollars	percent
1998	27.51	22.34	5.17	18.8
2018	31.05	26.92	4.13	13.3
	percent		dollars	percentage points
Change, 1998 to 2018	12.9	20.5	–1.04	–5.5

[1] The wage gap in dollars is calculated by subtracting women's average wage from men's average wage.

[2] The wage gap in percentage is calculated by first dividing women's average wage by men's average wage, then subtracting that result from 1.

Note: The difference between men's and women's average wages was found to be statistically significant at a 95% confidence level.

Source: Pelletier, R., Patterson, M., & Moyser, M. (2019). *The gender wage gap in Canada: 1998 to 2018*. (Catalogue 75-004-M-2019004). Ottawa, ON: Statistics Canada. Retrieved from https://www150.statcan.gc.ca/n1/en/pub/75-004-m/75-004-m2019004-eng.pdf?st=ZUqqSA0O

that people make and determine people's levels of happiness and productivity once they have acted on those choices.

The basis of vocational development theories is the concept of **career**, which is the term that captures the unique connection between individuals and social organizations over time. Many factors shape the individual's career, including personal development, the specific organization for which the person works, and the profession or occupational category that describes the individual's occupation.

Holland's Vocational Development Theory

According to **Holland's vocational development theory** (Holland, 1997), people express their personality in their vocational aspirations and interests. Holland proposed that there are six fundamental types (also called codes) that represent the universe of all possible vocational interests, competencies, and behaviours. Each of the six types is identified by its initial letter: Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C). The theory is also referred to as the **RIASEC model**, referring to the six basic types that characterize an individual's vocational interests (Figure 10.4).

The RIASEC types also apply to the occupational environment because they reflect particular patterns of job requirements and rewards. For example, social occupations involve work with people, and realistic occupations involve work with one's hands. Occupational environments, then, are the settings that elicit, develop, and reward specific interests, competencies, and behaviours of the individuals who work in those environments. If you are working in a realistic environment, you will be expected to complete activities that make use of your ability to work with things rather than your ability to work with people.

Vocational psychologists typically combine two or three of the codes in the RIASEC model to describe people and occupations. The first letter reflects the primary code into which a person's interest or occupation falls ("S" for Social, for example). The second and third codes allow for a more accurate and differentiated picture of the individual or occupation. Both construction worker and corrections officer are R code occupations, and both have the RE code designation. They differ in their third code, which is C for the construction worker and S for the corrections officer.

In one variant of the RIASEC model, two underlying dimensions of the six types are identified: interest in people versus things and preference for data versus ideas (Prediger & Vansickle, 1992). The R code reflects the extreme of interest in things, the S the extreme of interest in people, the combination of I and A is at the extreme of ideas, and the combination of E and C is at the extreme of data. Although meant to be comprehensive, the RIASEC model appears to benefit from including these additional dimensions (Deng et al., 2007).

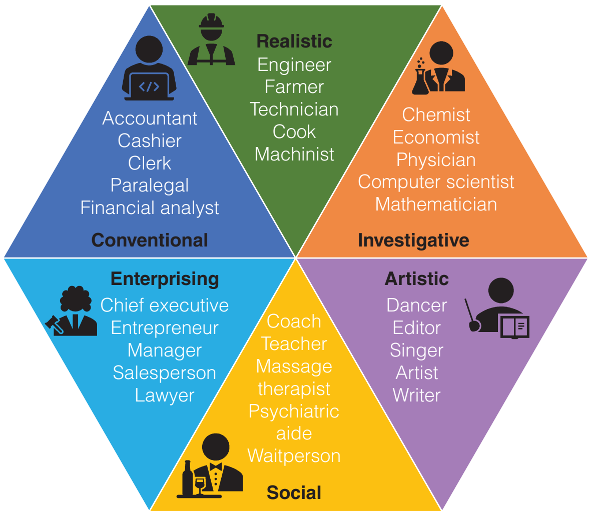
From a personality perspective, the RIASEC types as applied to individuals are very much like traits (Armstrong & Anthoney, 2009). Putting the two together, researchers have suggested that there are three underlying dimensions: interest in people versus things, preference for abstract versus concrete ideas, and striving for personal growth versus striving for accomplishment.

As you can see, the six RIASEC types are organized within the individual in a hexagonal structure. This structure implies that the types have a relationship to each other based on their distance from each other on the structure. Types that are most similar (such as R and C) are closest; those that are the most dissimilar (such as C and A) are farthest away from each other.

The notion of the hexagon is an important one because it helps define the way that your interests correspond to your

FIGURE 10.4

RIASEC Model



Holland's RIASEC model proposes that all occupations are organized according to six basic types.

environments. You will be most satisfied in your job if you are in an environment that fits your personality type. **Congruence** or "fit" occurs when your vocational type matches your occupational environment.

When your personality and work environment are congruent, you will be more satisfied and, as a result, more productive in your job. Supporting this idea, researchers have found that individuals who fit the Artistic type working in Realistic environments have lower work quality, at least in part because they feel dissatisfied (Kieffer et al., 2004). Lack of congruence can also lead people to become bored, if not outright dissatisfied (Phan & Rounds, 2018). The Artistic type in the Realistic job may wait out the hours until the workday is over and then rush home to work on crafts, play a musical instrument, or go to a pottery studio.

The RIASEC theory is empirically derived from the responses of many thousands of individuals who have been tested over the years of its development. Many of the studies on the RIASEC model used the **Strong Vocational Interest Inventory (SVII)**, which asks respondents to rate their top interests based on their preferences regarding work and leisure activities, areas of study (i.e., college courses), specific occupations, and preferences regarding their own work style learning environment, leadership style, desire to take risks, and team orientation. The SVII must be administered by a trained and certified practitioner. To assess yourself, you can take the **Self-Directed Search (SDS)**, a self-administered questionnaire that allows you to assess where you fit on the RIASEC dimensions; it also asks you to rate your strengths.

The RIASEC codes have now become fully integrated into **O*NET (Occupational Information Network)**, which consists of an interactive national database of occupations. O*NET (also called ONET) was established in 1998 by the U.S. Department of Labor, Employment, and Training Administration. You can go to the O*NET website (onetonline.org) and explore the options it provides, including lists of jobs that match your interests along with their RIASEC profiles and other vocational features as well as salary ranges, future outlooks for hiring, and prospects. People who are trying to find a job that will fit their interests, training, and experience can be greatly aided by this system, even if they do not live in the United States.

Consider the occupation of dental hygienist, which O*NET lists as having a "bright outlook." The RIASEC code is SRC and, in addition to the obvious tasks, requires technology skills in various software applications (mail, medical instruments, and spreadsheet). As a hygienist, you would be expected to maintain contact with others and use your hands to operate the cleaning equipment. There are almost 30,000 dental hygienists in Canada, and the projected growth is much faster than average. This information could be very useful to you in comparing this occupation with, for example, radiologic technologist, whose RIASEC code is similar but not identical (R and S, but no C).

The notion of congruence between people and jobs has received considerable empirical support, not only in terms of job ratings but also in terms of career change behaviour. All other things being equal, people will tend to move out of incongruent jobs and into positions more suited to their interests (Donohue, 2006). At the same time, their vocational interests and perhaps even their personality traits may change in response to socialization in their workplace (Wille & DeFruyt, 2014).

Unfortunately for many people, factors outside their control, such as discrimination due to gender, race, and ethnicity, limit these choices (Eshelman & Rottinghaus, 2015). For individuals whose vocational situations are affected by such constraints, the role of identity and the possibility for realizing one's true vocational interests are far less significant than the reality of these sociocultural factors.

Conversely, the RIASEC congruence model does not take into account another key feature of occupations, their level of prestige. You may be very attracted to a job involving the use of your hands, but all things being equal, a career as a neurosurgeon (which has a high prestige rating) would appeal to you more than a career in a less prestigious field (Guntern et al., 2016).

Super's Life-Span Life-Stage Theory

As individuals traverse the various stages of their vocational development, their sense of self also undergoes changes. **Super's life-span life-stage theory** focuses on the role of the self and proposes that people attempt to realize their inner potential through their career choices (Super, 1990). If you see yourself as an artist, then you will desire work in which you can express that view of yourself.

In contrast to Holland's theory, which emphasizes vocational preferences (the fact that you prefer artistic work), Super's theory places the focus on the occupation that you see as most "true" to your inner self. Super's theory also takes into account the fact that the constraints of the marketplace mean that people are not always able to achieve full realization of their self-concepts. In a society with relatively little demand for artists, the person with the artistic self-concept will need to seek self-expression in a job that allows for a certain degree of creativity but will also bring in a paycheck. Such an individual may seek a career in computer graphic design, for example, because that is a more viable occupation than that of an oil painter.

According to Super, the expression of self-concept through work occurs in a series of what he called "life-space life-stages" that include environmental determinants (e.g., labour market), situational determinants (e.g., period of history), and personal determinants (biological and psychological). In a sense, this model is very similar to Bronfenbrenner's ecological model and is compatible with the biopsychosocial approach. However, Super goes on to propose that these influences intersect with such life roles as student, "leisurite," citizen, worker, and homemaker or parent. Dividing the life course into stages from childhood through later life completes the life-space, life-stage model. Super's theory, then, views career development as occurring within a larger context.

From the standpoint of career development, four of the six stages proposed by Super are of greatest relevance, as shown in Figure 10.5. In the exploration stage (teens to mid-20s), people explore career alternatives and select a vocation that they feel will express their self-concept. By the time they reach the establishment stage (mid-20s to mid-30s), people are focused on achieving stability and attempt to remain within the same occupation. At the same time, people seek to move up the career ladder to managerial positions and higher. In the maintenance stage (mid-30s to mid-50s), people attempt to hold on to their positions rather than seeking further advancement. Finally, in the disengagement stage (mid-50s to mid-60s), workers begin to prepare for retirement, perhaps spending more time in their leisure pursuits.

When Super first wrote about career development, people often stayed in the same job with the same company for years, if not their entire employed life. At the same time, people had no choice but to retire and they saw their last decade of employment as a winding-down period. Combined with shorter life expectancies, this meant that many people employed in a career started to change the way they viewed their trajectories. This model began to change substantially in the 1980s, when large corporations began programs of downsizing, particularly after the advent of computerized technology. Moreover, as you will learn later, mandatory retirement was no longer legal for the majority of occupations, so that people could keep working longer, perhaps even starting second careers.

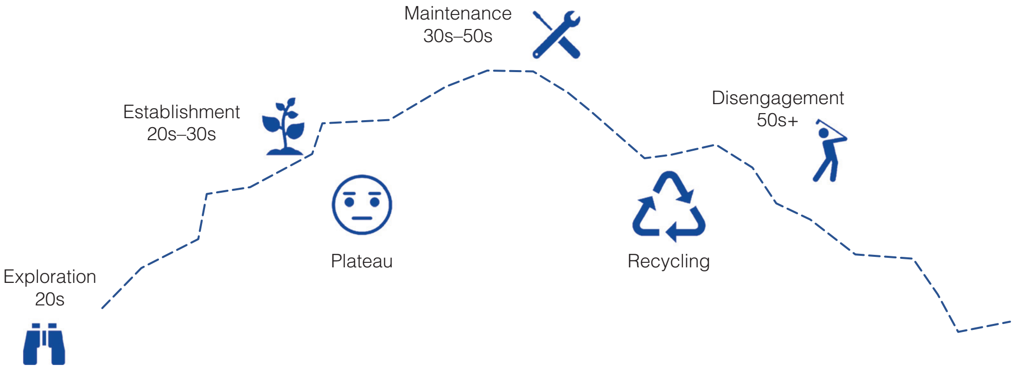
Changes in the dynamics of the labour force and retirement since the time of Super's original writing are now reflected in a more flexible view of career development. Workers now may consider **recycling**, in which they change their main field of career activity partway into occupational life (Duys et al., 2008). In recycling, middle-aged workers may find themselves once again in the establishment stage they thought they had left behind in their late 20s. Indeed, with constant changes in the demands of the labour market along with the greater labour force participation of midlife and older workers, recycling is likely to become increasingly normative.

On the other hand, people may also experience **career plateauing**, in which they remain static in their vocational development. They may experience structural plateauing, in which they do not advance up to higher-level positions, or content plateauing, in which they feel that they have mastered their work and no longer see it as challenging (Lapalme et al., 2009). People may reach their plateau at a young age if they enter a so-called dead-end job, or if their moves within or between companies involve lateral changes rather than vertical advancement. At that point, the individual may decide that it is time to seek another job (Heilmann et al., 2008). However, some employees are content to remain in the status quo, particularly if they have achieved success and are satisfied with their current position (Smith-Ruig, 2009).

There are strategies for those workers who wish to combat plateauing. A study of more than 300 government employees

FIGURE 10.5

Super's Life-Space Life-Stages Career Development Model



Super's life-space life-stages model of vocational development along with the variations of plateau and recycling for the period from the 20s to the 50s and beyond.

showed that workers who reported serving as a mentor were less likely to experience the negative effects of plateauing (Lentz & Allen, 2009). In line with Erikson's concept of generativity, such mentoring activities can help middle-aged and older workers with their own psychosocial development. Additionally, companies can help guard against plateauing by devising ways for workers who are not on track for promotion to benefit instead from job variety, job rotation, and job enrichment. Showing plateaued employees respect and appreciation can also help these individuals feel connected to their employer (Yang et al., 2019).

Occupation as Calling

The role of the self in vocational development forms the core of theories that emphasize people's desires both to achieve self-expression through their work and to contribute to the larger good. A **calling** is an individual's consuming passion for a particular career domain that serves people in some capacity and contributes to a sense of personal meaning and purpose. Whether it serves your own desire for fulfilling your potential or because you want to help others is less important than the fact that the calling is integral to your sense of identity (Michaelson & Tosti-Kharas, 2019). People can have a calling for a career that is not necessarily altruistic in nature.

Some of the features of a career that represents a calling include that you feel passionate about it, you enjoy this work more than anything else, are willing to make sacrifices to get into this field, have it on your mind in some way at all times, and find the actual work to be deeply gratifying (Dobrow & Tosti-Kharas, 2011).

The idea of work as calling is becoming increasingly recognized within vocational and counselling psychology, generating a rapidly growing area of research. The factors that predict whether people will be able to achieve their callings include person–environment congruence, career commitment, and sense of meaning in work. All of these are critical in helping individuals translate their perceived callings into one that they can actualize in their occupations. Personal motivation, support from the individual's organization, and the ability to engage in "job crafting" can help individuals realize their calling within their work environments (Duffy et al., 2019).

However, it might strike you that your calling might be a completely unrealistic aspiration. What if you always wanted a career as a professional musician but you're not good enough to break into the field? Your calling may still be in the musical field, but you will instead need to fulfill that desire through being a music teacher. It's also possible that you have to switch gears altogether because even music teaching is not a realistic goal for you. Instead, you might fulfill that calling by either playing on your own as a hobby or subscribing to a concert series in your local community. People who cannot find a job in the area of their calling may, therefore, find satisfaction through their leisure pursuits (Berg et al., 2010).

Variations in Vocational Development

Views of vocational development in which individuals guide their own paths contrast with the more passive career stage concept such as that proposed by Super's theory. The changing environment in which career development occurs increasingly is being viewed as providing workers with more opportunities to shape their own vocational development pathways. One idea within this new framework is that of the **boundaryless career**, or a career that crosses the boundaries of an employer or organization. People who adhere to the boundaryless mindset would agree with statements such as "I enjoy jobs that require me to interact with people in many different organizations" (Briscoe et al., 2006, p. 35).

The boundaryless career is, then, a frame of mind that allows workers to think more flexibly about their commitment to a particular employer. Although they may remain committed to working for the same organization, they may seek out horizontal connections to people in other companies who hold the same job or have similar interests as they do. Professional organizations, whether unions or scientific societies, tap into this boundaryless framework. People who belong to these organizations do not see themselves as competing with their fellow members, but instead as benefiting from the opportunity to share experiences and perspectives.

The second form of self-directed vocational development is the **protean career**, in which individuals are both self-directed and driven internally by their own values. In the protean career, the individual seeks personal growth through self-reflection and self-learning. Instead of focusing on external criteria for success, the individual following the protean career has internal standards for success that will enhance his or her identity. A strong protean career orientation is indicated by, for example, agreement with an item such as "I am in charge of my own career" (Briscoe et al., 2006, p. 34).

Examining data from 135 samples representing 35 countries (with over 45,000 participants), Wiernik and Kostal (2019) conducted a meta-analysis to determine the relationship between boundaryless and protean career orientations. Rather than the two concepts being distinct, it appears that they both tap what the authors call a proactive career orientation. People high on this overall factor are more likely to take their career management into their own hands in order to maximize their job satisfaction.

Individuals who believe that they can shape their careers appear to be high in the quality known as **core self-evaluation**, which represents a person's appraisal of people, events, and things in relation to oneself. The core self-evaluation is composed of self-esteem, generalized self-efficacy, high emotional stability, and the belief that you control your fate. Research on recent college graduates shows that people whose core self-evaluation includes the perception that they are highly employable will feel that they have the power to determine the shape of their careers (Rodrigues et al., 2019).

These findings regarding the importance of variations in vocational development reinforce the value of flexible careers. Additionally, they suggest the potential for organizations to create a culture in which individuals can seek the variations that best suit their particular developmental pathways (Tomlinson et al., 2018).

VOCATIONAL SATISFACTION

As we have just discussed, people find the most fulfillment from their jobs in terms of personal development when they can express their identities. The concept of **vocational satisfaction** refers to the extent to which people find their work to be enjoyable. For our purposes, we will consider vocational satisfaction to be equivalent to job satisfaction, as both terms are used in the literature. Vocational satisfaction is important to the individual as well as to the employer because workers who are satisfied show higher commitment to their jobs (Hoffman & Woehr, 2006).

Intrinsic and Extrinsic Factors

People can be satisfied with their jobs either because they love the work that they perform, they value the salary and other perks it provides, or some combination of the two. The distinction between intrinsic and extrinsic factors in vocational satisfaction, shown in Figure 10.6, represents the difference between those factors unique to the job itself and those which involve contributions to satisfaction that can come from any job, not that specific one.

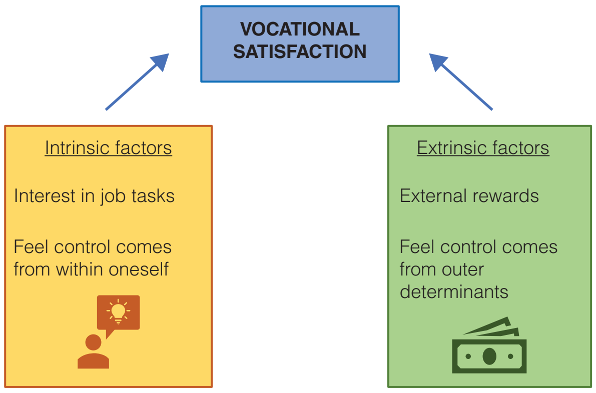
Intrinsic factors in vocational satisfaction refer to the tasks required to perform the work itself. The central defining feature of an intrinsic factor is that it cannot be found in precisely the same fashion in a different type of job. For example, the sculptor engages in the physical activities of moulding clay or stone, and the accountant must perform the mental activity of manipulating numbers. Although each job involves other activities, these are the ones that serve to define the work required to perform each.

Intrinsic factors involve or engage your sense of identity in that the work directly pertains to your feelings of competence, autonomy, and stimulation of personal growth. Your ability to express autonomy and self-direction in the daily performance of your job are also part of the intrinsic aspects of work because these factors are directly tied to your sense of self. Having work that is a calling fulfills your intrinsic motivation, but you can have intrinsic motivation for your work without feeling that it is a calling.

Extrinsic factors in vocational satisfaction are the features that accompany the job but are not central to its performance. You can receive extrinsic satisfaction from many different jobs regardless of the work tasks they require. The easiest extrinsic factor to understand is salary. Although some jobs earn more than others, you can earn the same amount of money by performing very different work tasks. A professional athlete and a real estate magnate may earn the same six- or seven-figure salary for performing a very different set of job activities. Therefore, salary is not intrinsic to work.

FIGURE 10.6

Intrinsic and Extrinsic Factors in Vocational Satisfaction



Two basic categories of factors that influence vocational satisfaction are intrinsic and extrinsic.

There are a number of additional extrinsic factors associated with the conditions of work, such as the comfort of the environment, demands for travel, convenience of work hours, friendliness of co-workers, amount of status associated with the job, and adequacy of the company's supervision and employment policies. These aspects of work do not directly engage your sense of personal identity and competence. Although a high salary may certainly reinforce your sense of worth (particularly in Western society), you can earn that high salary in many ways that are not necessarily tied to your true vocational passions. Other extrinsic but important factors for vocational satisfaction involve the emotional climate of the workplace and attitudes towards individuals of diverse races (Lyons & O'Brien, 2006) and sexual orientations (Velez & Moradi, 2012).

At this point in your life, you may or may not have had a job that you felt was intrinsically satisfying. However, you can probably think of people you know who do feel connected to their work at an intrinsic level. Perhaps you have encountered a customer service representative who seemed genuinely interested in helping you solve a problem and was willing to work with you until you found the satisfactory solution. This may have been an employee who found the job to be intrinsically rewarding, feelings that she expressed in the apparent pride that she took in helping you with your situation.

Intrinsic factors give you a sense of active engagement in your work and contribute to your sense of self. The customer service representative who provided you with such kind and gracious help may not see her job as one that represents her life's work; however, she may nevertheless enjoy the part of her job that allows her to get people what they need.

Intrinsic and extrinsic factors are also the basis for understanding the role of motivation in vocational satisfaction. According to the **two-factor motivational theory** intrinsic factors are job "motivators" and extrinsic factors are the "hygiene" conditions present in the workplace. When people work for intrinsic reasons, according to this theory, they will be more likely to achieve self-actualization. Favourable hygiene factors can prevent people from becoming dissatisfied, but they do not serve as the sole motivator for work. Growth, self-fulfillment, and feelings of achievement can only come from the fulfillment of job motivators, not from hygiene factors (Herzberg et al., 2005).

Expanding upon the two-factor motivational theory, **self-determination theory** proposes that workers attempt to fulfill their needs for competence, autonomy, and relatedness (Deci & Ryan, 2008). When workers fulfill their competence needs, they are able to feel a sense of mastery. Autonomy needs include the worker's desire to feel in control over the conditions under which the job is performed. Relatedness refers to the need to feel connected to others. In the ideal situation, workers experience a sense of self-determination, in which they are expressing their true interests and abilities (similar to intrinsic factors), are able to have a voice in what happens to them at work (similar to extrinsic factors), and share a sense of belongingness with their fellow workers. Conversely, when these conditions are not met, workers are more likely to seek other employment or if they cannot, to experience burnout and poor health (Olafsen et al., 2017).

One of the assumptions of self-determination theory is that people will work harder when they feel they are in control of what they do (autonomy) and are able to satisfy their needs for mastery. As you can attest from your own experiences, however, you cannot have complete freedom over every aspect of your job because you do need to answer to your supervisor or employer's requests for you to complete the job tasks. The point of self-determination theory is that you have as much autonomy as is feasible or at least feel that you can work within your employer's requirements. Your boss may ask you to complete "x" numbers of tasks in a given day; ideally, you feel that this is a reasonable demand so this becomes an internal goal that you also adopt.

Early in the development of self-determination theory, its originators identified the process of **motivation crowding out**, in which people's intrinsic motivation decreases when they receive extrinsic rewards for completing the work they enjoy. This idea began to become implemented in the workplace though with the caveat that people will not, or cannot, work for free. In a meta-analysis of 183 studies on nearly 213,000 individuals, Cerasoli et al. (2014) found that across a variety of domains, intrinsic motivation predicted the quality of work while incentives or extrinsic rewards predicted quantity.

Positive and Negative Moods

Job satisfaction can be affected not only by the motivation to work but also by people's feelings about their jobs. You can have feelings on the job (such as being excited about the upcoming weekend) and feelings about the job (such as liking your job activities). According to **affective events theory**, events at work lead individuals to experience affective reactions, and these in turn influence attitudes towards work and performance (Weiss & Cropanzano, 1996).

Rawpixel Image/Pixabay

Having an enjoyable workplace environment can be an important contributor to job satisfaction.

There are many factors that can affect your mood and, ultimately, your satisfaction at work. For example, if you experience positive events at work, such as being complimented by a supervisor, you will have a positive emotional experience; if you experience negative events, such as conflict with a co-worker, your emotions will be negatively affected. By the end of the day, your negative mood will affect the way you feel when you return home (Kempen et al., 2019).

Your mood when you wake up in the morning can become an important influence on the way you feel about your work as you go through the day. This was the finding of a study of 29 customer service representatives employed at a call centre of an insurance company. Researchers tracked mood changes throughout the day, the affective display of their customers, and the employees' affect subsequent to the call. The organization measured the productivity of the employees. The call centre employees who started the day in a bad mood rated their customers more negatively. After talking to customers who displayed positive affect, the employees themselves felt better. In contrast, after talking to a customer who displayed negative affect, the employees felt no worse themselves, but their productivity suffered in that they were more likely to take a break after such a call. The findings suggest that start-of-the-day mood plays an important role in affecting how employees feel throughout the day and, ultimately, how well they perform (Rothbard & Wilk, 2011).

From your own job experiences, you can probably also relate to the ways that positive emotions can be boosted under the right conditions at work. Employers who provide an environment in which employees can engage in a shared pleasant activity can help boost overall productivity through such activities as outings, team building activities, relaxing, and sharing jokes (Tang et al., 2017).

Fortunately, the fluctuations across the day, or "affect spin," do not seem to have effects that carry over to the next day at work. Changes in affect seem responsive to the events that actually take place during the day, such that positive events can make up for prior negative workplace-related events (Clark et al., 2018).

Personality traits can also influence the ways in which people interpret what happens to them at work. Affective events theory predicts that people will differ in their reactions to daily work experiences on the basis of their personality traits. You might think that people high in agreeableness would be better able to bounce back from negative interactions at work. However, in a study of university employees, researchers found that those high in agreeableness actually had more negative affect following interpersonal conflict than those low in agreeableness. Highly agreeable employees were also more likely to experience negative affect when they perceived their work environment to be low in social support (Ilies et al., 2011). By the same token, the personality of supervisors can also affect the way they are affected by their own work overload. Supervisors high in agreeableness will be less likely to take out their frustrations on their employees (Eissa & Lester, 2017).

In general, it appears that high subjective well-being predicts job satisfaction. In a meta-analysis testing the relationship over time between overall well-being and job satisfaction, researchers found more support for the direction from subjective well-being to job satisfaction than vice versa. Consistent with other research on overall mood, it appears that people high in subjective well-being tend to experience more positive emotions that carry over into their work lives (Bowling et al., 2010).

Personality traits may also interact with changes in job satisfaction over time. Looking at the intrinsic–extrinsic dimension of vocational satisfaction, researchers have found that people with high neuroticism scores are less likely to feel that their jobs are intrinsically rewarding. Perhaps for this reason, neuroticism is negatively related to job satisfaction; by contrast, people high in the traits of conscientiousness and extroversion are more satisfied in their jobs (Furnham et al., 2009). By the same token, people's personalities may be affected by their levels of work satisfaction. In one longitudinal study, workers who were more satisfied with their jobs showed moderate increases in extroversion (Scollon & Diener, 2006).

Person–Environment Correspondence

We have seen that Holland's vocational development theory proposes that people seek to find congruence between their personality and the characteristics of the job. According to **person–environment correspondence theory**, people are most satisfied when their workplace responds to their needs. In contrast to Holland's congruence model, person–environment correspondence theory focuses on needs rather than interests (Dawis, 2002). Person–environment correspondence theory stresses the role of values in promoting job satisfaction. **Occupational reinforcement patterns (ORPs)** are the work values and needs likely to be reinforced or satisfied by a particular occupation. The six ORPs are (1) achievement: using one's abilities and feeling a sense of accomplishment; (2) altruism: being of service to others; (3) autonomy: having a sense of control; (4) comfort: not feeling stressed; (5) safety: stability, order, and predictability; and (6) status: being recognized and serving in a dominant position.

As you think about your own values and needs, contrast the extent to which you focus on achievement with your desire to be of service to others. Reflecting the importance of ORPs, O*NET incorporates ORPs into its job-search system. The original six value dimensions are now labelled achievement, working conditions, recognition, relationships, support, and independence. Occupations high in achievement range from veterinarian to actor; those high in relationships include rehabilitation counsellor and human resource specialist. Research continues to support the role of person–environment correspondence to workplace adjustment suggesting that, over time, workers attempt to fit the demands of the job to their own work styles (Bayl-Smith & Griffin, 2018).

Work Stress

Work stress can be a major threat to people's feelings of well-being and can eventually take its toll on physical health as well. There are many forms that work stress can take, as we have already seen, ranging from negative interactions with co-workers to difficulties dealing with clients, customers, and supervisors. People may also experience stress when they feel that their job is not compatible with their needs, interests, values, and personal dispositions. Therefore, work stress is a very broad category. For our purposes, we will turn here to studies that specifically examine ratings of stress as reported by employees in specific situations.

Emotional labour is the requirement in service-oriented jobs in which workers must smile and maintain a friendly attitude regardless of their own personal feelings or emotions. Performing emotional labour can be stressful to those service employees who feel that they must constantly put on an act in order to carry out their job successfully. This component of emotional labour, or "surface acting," puts stress on the employees who feel constantly that they have to simulate emotions they truly do not feel. Even though people who like jobs in which they are required to interact with the public may gravitate towards those jobs, the disconnect between the way they are feeling and the constant pressure to put on a false front can erode their vocational satisfaction (Bhave & Glomb, 2016).

Workers can help to alleviate emotional labour by engaging in a deeper level of identification with the emotions they are expected to portray (Chu et al., 2012). Emotional labour can also take the form of needing to cover up a stigmatized but concealable identity in the workplace, such as sexual orientation or a non-normative family situation. When they feel they can reveal this hidden aspect of their identities, their productivity can benefit as can the atmosphere in the workplace (Berkley et al., 2019).

Workplace bullying is another form of stress in which individuals are exposed over a lengthy period to negative interpersonal acts on the job which they cannot cope with or control. Some forms of workplace bullying include social isolation, direct harassment, intimidating behaviour, work-related criticism, and physical violence. A large study carried out in Denmark on over 1,000 workers from 55 workplaces showed that all forms of workplace bullying were stressful, particularly direct harassment and intimidating behaviour (Hogh et al., 2012). Thus, individuals exposed to work-related bullying become traumatized in ways that can lead to both psychological and physiological consequences.

Work-related stress can take its toll on physical functioning as shown by studies conducted within Whitehall II. Holding all other factors constant and excluding participants who were initially obese, men under high levels of work stress over the course of the study had twice the risk of subsequently developing metabolic syndrome. Women with high levels of stress had over five times the risk of developing this condition (Chandola et al., 2006).

Lack of job fairness can be another workplace stressor, and as shown by Gimeno et al. (2010) in Whitehall II, men who reported higher justice at work were less likely to have metabolic syndrome than those who felt their job conditions were unfair. For women, stress encountered at work independently predicted type 2 diabetes, even after controlling for socioeconomic position and stressors unrelated to work (Heraclides et al., 2009).

Physiological data obtained in the form of cortisol levels from Whitehall II also illustrate the impact of employment grade on health. People in lower employment grades have less control over their work conditions and, as a result, can experience greater stress. Daily assessments of cortisol, the hormone involved in the response to stress and anxiety, were taken from an older Whitehall cohort six times throughout the day. Men in lower employment grades showed higher cortisol levels early in the morning, levels that remained higher throughout the day than for men in higher employment grades. These higher levels could be explained not only by higher levels of stress during the day but also by poorer quality of sleep at night (Kumari et al., 2010). This differential level of workplace control on cortisol patterns can even carry through to the retirement years (Chandola et al., 2018).

Thus, maximizing workplace satisfaction, in addition to helping maintain worker productivity, can make a key difference in promoting the health and long-term well-being of individuals.

Relationships Between Work and Family Roles

One of the great challenges of adult life is dividing your time, energy, and role involvement across your many commitments. The two areas that many people find most difficult to integrate in terms of competing demands are occupation and family life. Both carry with them major obligations and responsibilities, and both contribute heavily to the individual's sense of identity. However, they do not necessarily need to be in conflict, as research is increasingly demonstrating.

According to the **work–family enrichment model**, experiences in one role improve the quality of life in the other. This model is based on the theory of conservation of resources, which proposes that organizations can protect their workers against stress by providing them with support to maintain both their work and family roles (Hobfoll, 2002).

As shown in Figure 10.7 (top half), enrichment can take the form of development, in opportunities for growth, and affect, or levels of happiness. The need to balance work and family life can lead the worker to become more time-efficient, a benefit that carries over to the job. Conversely, apart from supplying a salary, work provides individuals with social capital in the form of feeling a sense of accomplishment. Researchers also use the term "positive spillover" to describe this transfer of skills from one domain to the other (Masuda et al., 2012). There can also be crossover effects onto the spouse who not only feels better about the relationship but also about the spouse's workplace (Carlson et al., 2019).

Alternatively, the **work–family conflict model** proposes that people have a fixed amount of time and energy to spend on their life roles. This model is based on a scarcity perspective (Edwards & Rothbard, 2000) according to which the more time and energy people invest in one area, the less they have for the

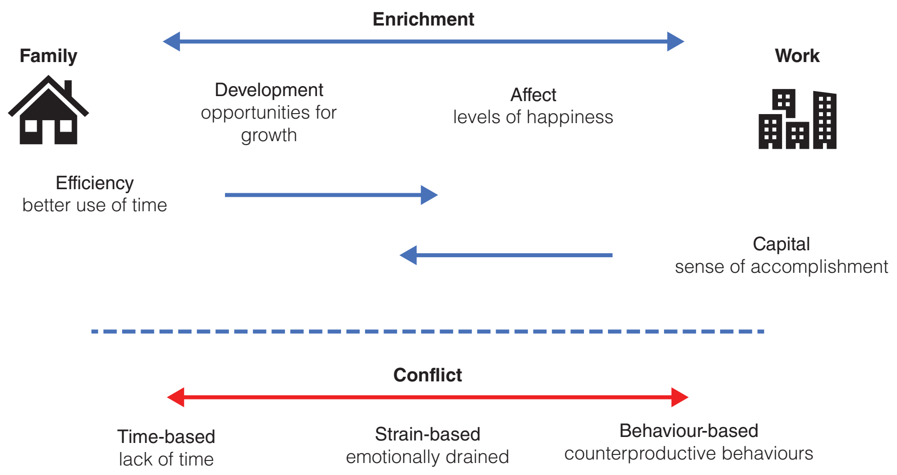


FIGURE 10.7

Two Models of Work– Family Relationships

Relationship between work and family roles can be conceived in terms of enrichment or conflict.

other set of demands and activities. The workaholic, according to this view, has little energy or time for family relationships.

As shown in the bottom half of Figure 10.7, conflict can take a variety of forms including lack of time and emotional exhaustion (van Hooff et al., 2005). At an extreme, work–family conflict can take the form of counterproductive behaviours on the part of the employee (such as leaving early, taking office supplies home) as retaliation for a perceived lack of support (Morgan et al., 2018).

There are variations in the extent and impact of work–family conflict, however, and not all workers feel the same degree of conflict. Conflict is most likely to occur among mothers of young children, dual-career couples, and those who are highly involved with their job. Additionally, work–family conflict is higher for workers employed in the private sector than those employed in the public sector (Dolcos & Daley, 2009).

From the perspective of affective events theory, positive experiences at home should translate into better moods at work, and vice versa (Kempen et al., 2019). Conversely, people who experience exhaustion as a result of work–family conflict may perceive the work–family trade-off as more stressful, which only increases their exhaustion (Rubio et al., 2015).

With all of the possibilities for unfavourable outcomes posed when work and family demands do become mutually exclusive, organizations are increasingly recognizing the importance to their workers of providing a "family-friendly" environment, which may include support and schedule control. As shown in a study in the banking sector conducted in Spain, even if family-friendly work policies do not alleviate all forms of stress, the fact that they exist can generate positive effects by showing that the organization cares about the well-being of its workers (Medina-Garrido et al., 2019). Ultimately, for these measures to be effective, workers need to feel that they can take advantage of them without worrying they will give up opportunities for promotion or other rewards from their supervisors (Moore, 2018). Perhaps for this reason, benefits that help employees fulfill their childcare arrangements are more important than flexible work schedules (Pailhé & Solaz, 2018).

Age and Vocational Satisfaction

The question of whether job satisfaction increases, decreases, or stays the same over adulthood is a surprisingly difficult one to answer. Age interacts with other factors, including gender, level of employment, salary, and the nature of the work environment. In addition, workers of the same age may differ in **job tenure**, the length of an individual's employment. Separating age from tenure becomes particularly important in understanding vocational satisfaction as individuals grow older.

Taking into account the differences between age and job tenure turns out to be an important consideration in examining changes in vocational satisfaction over time. In a longitudinal study of nearly 22,000 employees across two studies spanning 40 years, Dobrow Riza and colleagues (2018) found that tenure is associated with a decrease in vocational satisfaction. However, older employees who switched jobs actually increased in satisfaction. At the same time, those employees who did change jobs also received higher pay, which was positively related to their vocational satisfaction.

The finding that salary is tied to increased job satisfaction in older workers who change employers might suggest that, as people age, salary may come to represent a token of worth in addition to providing extrinsic rewards. However, it is also possible that the employees who are offered new jobs at higher pay have more job skills than those who remain in the same position throughout their careers.

The **Canadian Human Rights Act**, passed by Parliament in 1977, prohibits discrimination on the basis of age, among other factors, and the legal responsibility for enforcing the act may be either federal or provincial, depending on the employer. For example, those employed by banks and airlines in Canada are regulated by the federal government. The act was intended, among other things, to provide protection for older workers from discrimination by employers who would otherwise seek to replace them with younger, cheaper, and presumably more productive employees.

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Canada's oldest mayor, Hazel McCallion, served as the mayor of the city of Mississauga for 12 consecutive terms until she retired in 2014 at the age of 93. The *Canadian Human Rights Act* prohibits discrimination on the basis of age.

However, age discrimination is a complicated legal issue and some would suggest that the "mandatory retirement regime in most parts of Canada is a form of legal discrimination" (Klassen & Gillin, 2005, p. 51). These authors provide an excellent historical account of age discrimination cases, court decisions, and human rights developments. For example, the 1982 *Etobicoke* decision involved the dismissal of firefighters at the age of 60. The court examined whether the mandatory retirement requirement was based on a bona fide occupational requirement (BFOR), and decided that it was impressionistic rather than based on scientific evidence. This was clearly a case of discrimination against firefighters over the age of 60. Klassen and Gillin (2005) argue that workplace management schemes (e.g., collective agreements, pension arrangements) perpetuate age discrimination in the workplace.

Despite the reach of age discrimination legislation not only to the workplace, but also to hiring, ageism still exists and can take many forms, ranging from biases against the abilities of older workers to stereotyped beliefs about their personalities and work attitudes (O'Loughlin et al., 2017). One study found that 29 percent of older workers experienced the "soft" form of age discrimination involving the interpersonal sphere. Women and workers whose jobs were precarious seem particularly likely to be targets of this more subtle form of age discrimination (Stypinska & Turek, 2017).

Social cognitive career theory helps to explain why older workers who experience age discrimination, particularly the interpersonal variety, are likely to become dissatisfied. Older workers who feel that their contributions are not valued, or who experience ageism on the job, will have lower vocational satisfaction as their core self-evaluations erode in the face of an unsupportive work environment (Foley & Lytle, 2015). The potential for older employees to feel negative emotions is also heightened if their supervisors are considerably younger than they are (Kunze & Menges, 2017).

Level of occupation is yet another factor to be considered in vocational satisfaction, as a person in a managerial position who is earning a high salary has the resources to invest time and energy in non-work options. Of course, a higher level of employment may involve higher daily job demands, leading to less time for leisure pursuits. Individual differences in the extent to which an adult believes in the "work ethic" may also interact with the age–job satisfaction relationship. Older employees who continue to feel engaged in their work will be more likely to be able to fend off perceived age discrimination, even putting off their retirement age (Bayl-Smith & Griffin, 2014). Identifying oneself as an "older worker" may not, therefore, negatively impact the individual's perceived involvement in the job.

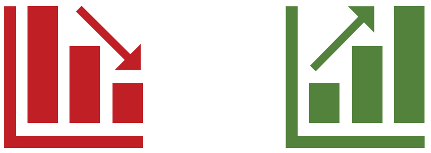
AGE AND VOCATIONAL PERFORMANCE

We've seen how individuals feel about their jobs throughout the years of adulthood. Now it's time to evaluate how well people perform in these jobs. As you might imagine, there are a host of variables to consider in addition to age, including education, occupational status, health, cognitive functioning, and personality. The core components of the job, or the tasks that employees need to have to perform successfully, serve a major role in determining the quality of older workers' performance. Additionally, workplace behaviours influence older workers' ability to contribute to the organizational environment, which, in turn, influences the productivity of all employees.

Figure 10.8 provides a "scorecard" for evaluating older workers' performance. On the loss side, older workers will encounter difficulty in jobs that require strength or agility beyond their capability. Jobs that require a great deal of exertion such as stooping, physical effort, kneeling, crouching, and lifting present more injury risks for older workers (Fraade-Blanar et al., 2017). Shift work requiring changing work hours is a second job factor that will make the job more difficult for older workers due to age changes in circadian rhythm (Bonnefond et al., 2006).

FIGURE 10.8

Age and Work Performance Scorecard



Job factors that contribute to decline	Worker factors that contribute to improvement
Physical exertion	Openness to change
Shift work	Greater expertise
Age bias	Fewer absences
Lack of collaboration	Know the ropes
Cognitive effort	Fewer injuries

Whether age contributes to better or poorer vocational performance depends on the balance between the factors that contribute to decline and those that contribute to improvement.

From the employee's perspective, a corporate culture that fails to guard against biases towards older employees can also create a work environment that negatively affects their job performance. In a simulation of a mail-sorting task on a desktop computer, workers who were primed with negative age stereotypes performed with less accuracy than those who received positive unconscious priming (Kirchner et al., 2017).

In a similar vein, employers who exclude older workers from opportunities to collaborate may also ensure that the "age handicap" remains in the way these employees are able to contribute. When older employees are able to meet in a collaborative fashion with other workers, they are able to be more productive (Guillén & Kunze, 2019).

Finally, job tasks that require speeded performance, attention, working memory, and flexibility can present a greater challenge to older workers, as was shown in a flight stimulator study of pilots. However, pilot expertise was found to compensate, to some extent, for those cognitive changes (Van Benthem & Herdman, 2016).

In looking at other positive attributes of older workers, tenure becomes more important than age (Ng & Feldman, 2013). Thus, workers who have been in the job longer are better able to navigate the system, because they know whom to consult when something needs to be done. Having learned the ropes is also valuable in helping employees with longer tenure to understand the negative consequences of taking involuntary absences. Finally, their tendency to be more careful can also help older workers avoid injury and therefore have better safety records.

Willingness to consider change is another characteristic of older workers that can contribute to better job performance.

Countering the stereotype that older workers are resistant to change, researchers have found that not only is this untrue, but also that higher openness to change is related to the better job performance of older workers (Kunze et al., 2013).

The findings on age and job performance, like those in the area of vocational satisfaction, point to the importance of applying knowledge about adult development and aging in general to specific questions relating to older workers. From a human resources perspective, managers need to attend to the varying capabilities of workers of different ages and also to take into account age dynamics as they play out in the workplace, balancing the complementary strengths of workers of younger and older ages. In such environments, all workers can achieve their maximum performance while also feeling that they have something worthwhile to contribute in the workplace.

RETIREMENT

Retirement may be the furthest thing from your mind if you are a university student in your late teens or early 20s. You are most likely concentrating on finding a job rather than retiring from one. Ideally, you will find a job that you enjoy and that will also give you a solid basis for being able to spend 10 or 20 years (or more!) enjoying your retirement years.

Many people think of retirement as an event that is marked by a ceremony, such as the proverbial "gold watch" given to a retiree as thanks for years of loyal service. This traditional image of retirement was never really true, however. Even when careers had more predictable trajectories, people often continued to maintain some type of employment after they retired from their primary job. The definition of retirement is becoming even murkier with current changes in labour force participation by individuals in their middle and later years, as you will soon learn.

The economy's health affects not only the financial security of the employed but also the financial security of the retired. Interest rates, tax policies, inflation, and the overall growth of the economy are some of the factors that determine the amount of money that retired individuals receive from their various sources of income. Policies being decided upon now by governments around the world will affect billions of older individuals in the decades to come. You might feel as though you are years away from retirement and therefore are not affected by these debates, but they are affecting your paycheque now and will continue to have an impact on your financial stability throughout the rest of your life.

Definitions of Retirement

Retirement is defined simply as the withdrawal of an individual in later life from the labour force. However, for most workers, retirement occurs in a series of phases through which they progress at least once, if not several, times throughout their lives.

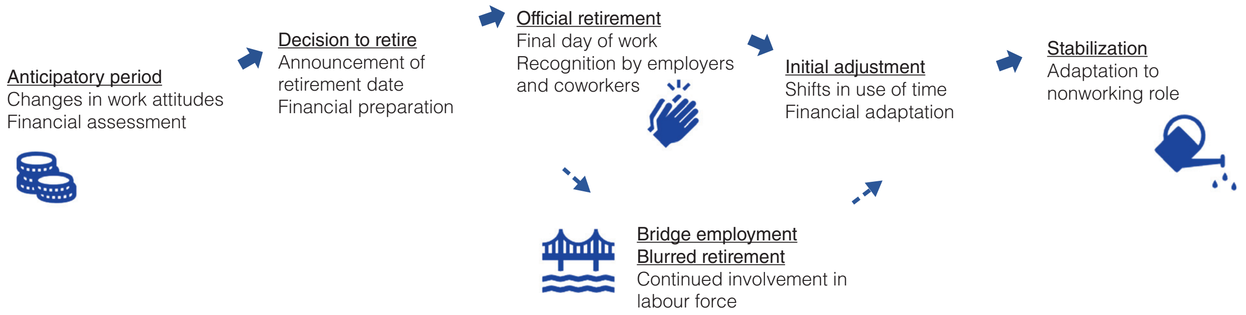
Because retirement is not simply an event with a defined start and end point, it is best conceptualized in terms of a period of adjustment (Wang & Shultz, 2010). The retirement process occurs over five phases, as shown in Figure 10.9. People experience an anticipatory period that may last for decades. Eventually, they make the decision to retire. After their last day of work in the particular job (the act of retirement), workers go through an initial adjustment period, followed, ultimately, by a more or less final restructuring of their activity patterns.

Complicating this picture is the fact that fewer and fewer workers are showing the **crisp retirement pattern**, in which they leave the labour force in a single, unreversed, clear-cut exit. More typically, retirees show the **blurred retirement pattern**, in which they exit and re-enter the labour force several times. Some accept **bridge employment**, which is when retirees work in a completely different occupation than they had during most of their adult life. For example, an insurance agent may retire from the insurance business but work as a crossing guard or a server at a fast-food restaurant. Other workers may retire from one job in a company and accept another role in the same company.

In general, involvement in bridge employment is strongly related to financial need. Workers who have a long, continuous history of employment in private-sector jobs tend not to seek bridge employment because they typically have sufficient financial resources (Davis, 2003).

FIGURE 10.9

Retirement Process



Retirement is best thought of as a process that evolves over stages until stabilization is achieved.

Ultimately, the criteria for retirement are met when an individual in later life with a cohesive past work pattern has not worked for a sustained period of time and is not psychologically invested in work any longer (Beehr et al., 2000).

Facts About Retirement

Retirement is in many ways a 20th-century phenomenon (Sterns & Gray, 1999). Throughout the 1700s and mid-1800s, very few people retired—a trend that continued into the 1900s. The jobs held by older workers often held high status and prestige. The wisdom and experience of older workers were valued, and it was considered a benefit to society to have them continuing to contribute to the workplace. However, by the early 1900s, mechanization in industry, fuelled by the war effort, and urbanization made many older workers redundant and jobs for older workers were difficult to find. This, in combination with increased longevity, led to increased poverty among the elderly, which was the impetus for Canada's first Old Age Pensions Act, passed in 1927 and jointly administered by the federal and provincial governments. It provided a monthly **Old Age Security (OAS)** benefit of $20 for British subjects 70 years of age and older who had lived in Canada for 20 years and whose annual income was less than $365. In 1952, this was replaced by the Old Age Security Act, a universal pension plan that was available to all Canadians aged 70 or older, entitling them to a taxable benefit of $40 per month (Human Resources Development Canada, n.d.).

In 1966, the federal government implemented the **Canada Pension Plan (CPP)**, a compulsory social insurance plan requiring employers and employees to contribute to a retirement benefit that includes long-term disability and survivors' benefits. Quebec is the only province to have its own contribution-based pension scheme, the **Quebec Pension Plan (QPP)**, which was also established in 1966. Recognizing that these plans failed to fully address the significant problem of poverty among the elderly, the government supplemented them with the **Guaranteed Income Supplement (GIS)** in 1967. Since that time, a number of significant changes have been made to Canada's pension system, including, in 2000, the extension of benefits to same-sex and common-law couples (Human Resources Development Canada, n.d.).

How does OAS work? If you are living in Canada, you must be 65 years of age, be a Canadian citizen or a legal resident, and have resided in Canada for at least 10 years after turning 18. In April 2023, the age of eligibility for both the OAS and the GIS will begin to increase from 65 to 67, with the change fully effective by January 2029. The age for survivor allowance (awarded when your spouse or common-law partner has died) will also gradually increase from 60 to 62 years. In addition, you can defer receiving your OAS pension for up to 60 months in return for a higher monthly amount. The OAS is a taxable benefit and is subject to a repayment requirement, or "recovery tax," for those with higher net incomes. OAS is funded from the federal government's general revenues and is a "pay-as-you-go" system, meaning that OAS can only pay out what is paid into it. Although it sounds like you personally invest in your own retirement benefits, it actually means that workers pay into the system to pay for current retirees.

Everyone in Canada who meets the basic requirements is eligible for OAS. In contrast, CPP and QPP cover only those in the paid workforce. Perhaps the largest group of people who are excluded are full-time homemakers, although they are entitled to share their spouse's benefits and may collect as much as 60 percent in a survivor's allowance once their spouse dies. (This also applies to common-law partners.) The CPP also provides disability benefits in the event of a severe and prolonged disability. The amount of your pension depends on how much and how long you have contributed to the CPP and it is adjusted to take into account the increase in cost of living. It also takes into account periods of time when you had little or no income. The Government of Canada website provides current data OAS and GIS amounts, and the amounts for the Survivor allowance.

One of the questions that is probably on your mind is whether there will be any funds left to pay your OAS when you reach the age of eligibility. While the answer appears to be yes, you would be wise not to rely entirely on government benefits. Canadian political leaders are struggling with the economic ramifications brought about by the growth of the older population. OAS and other benefits continue to rise, placing greater strain on the economy as a whole. Simply put, the almost two-thirds of Canadians without workplace pension plans do not have sufficient retirement savings (Ambachtsheer & Nicin, 2020).

Other Western countries are also facing questions about the future of their government pension programs and the potential problem of escalating poverty among retirees. The European Union (EU) countries such as France, Germany, Italy, and Greece are grappling with an aging population that will need to be supported by a smaller workforce. As a result, EU nations are beginning to examine stronger incentives to reduce early retirement and keep more older workers in the labour force (European Union, 2019). Indeed, a group of researchers in the United Kingdom recommended that, to keep older workers in the workforce longer, employers should more consciously recognize the contributions of older workers and create a less toxic work environment that leads them to exit prematurely (Carr et al., 2016).

Changing demographics are clearly putting pressure on the global economy to ensure the financial security of retired individuals. It is likely that a combination of later retirement, longer involvement in the workforce, and difficult decisions by policy makers will be needed sooner rather than later. Changing the norms in countries whose pension systems support early retirement or retirement at age 65 may require putting more effort into making continued employment seem more attractive such as making work more challenging, appreciating the contributions of older workers, reducing physical demands, and, of course, providing financial incentives (Rijs et al., 2012).

Now that you know the scope of the problem, you can see why we stated at the outset that knowledge about retirement even while you are in university may help you as you think about your own future and that of your family.

The Effects of Retirement on the Individual

Until the 1960s, most Canadian workers resisted the idea of retiring because they believed that retirement would place their financial security at risk. However, succeeding generations of workers are viewing retirement more positively. In part, this is because their retirement earnings are higher than those for past older Canadians. Just as importantly, with the abolition of mandatory retirement for most jobs, older workers no longer feel forced out of the labour market.

Furthermore, retired individuals no longer necessarily experience the poor health, low income, and loss of status that was associated with exit from the labour force earlier in the 1900s. Many older individuals can also look forward to a healthy period of retirement in which they can continue to pursue part-time work as desired, travel, spend time with family, and move to more comfortable climates or housing situations.

The increasingly outdated view of retirement as an unwanted life change fits most closely with the **role theory of retirement**, which proposes that retirement has deleterious effects because the loss of the work role loosens the ties between the individual and society.

The **continuity theory of retirement** proposes that retired individuals maintain their self-concept and identity over the retirement transition. Even though they are no longer reporting for work on a daily basis, they are able to engage in many of the same activities they did when they were working. In addition, a retired person remains a retired "X" in his or her community, a status conferred officially in some professions as in retired professors who are referred to as "emeritus." These two theories focus on retirement as an isolated event.

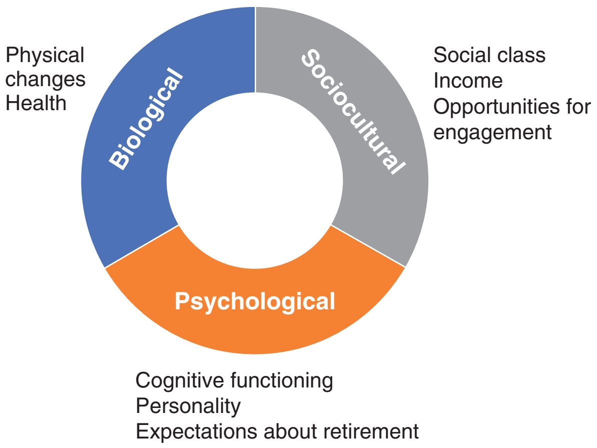
The **life course perspective on retirement** proposes that changes in the work role in later life are best seen as logical outgrowths of earlier life events. The factors that shaped the individual's prior vocational development will have a persisting influence throughout retirement.

According to the **resource model** of retirement, the individual's adjustment to retirement reflects his or her physical, cognitive, motivational, financial, social, and emotional resources: the more resources, the more favourable will be the individual's adjustment at any one point through the retirement transition (Wang & Shi, 2014). Indeed, the resource model is a form of continuity theory, in that an individual's resources prior to retirement also predict the resources that will be available through the retirement years (Wetzel et al., 2019).

The resource model fits well with the biopsychosocial perspective, as shown in Figure 10.10. As you can see from Figure 10.10, physical changes and health are important biological contributions to retirement adjustment. Individuals with higher levels of physical functioning, and those in good health, are better able to enjoy retirement pursuits, and may also be better able to take advantage of bridge employment opportunities. From a psychological perspective, retirees who view retirement with a positive set of expectations will be able to adapt better to retirement, perhaps invoking a sense of mastery about their ability to make the transition work for them (Muratore & Earle, 2015).

FIGURE 10.10

Biopsychosocial Model of Retirement



Retirement is best thought of as a biopsychosocial process.

Related to expectations, the timing of the retirement decision is another key factor influencing the individual's ability to adapt, easing the transition to retirement can be helped by invoking a sense of mastery, or the belief in one's ability to adapt successfully (Muratore & Earl, 2015).

Voluntarily retiring, instead of being forced to retire through downsizing, also promotes better adaptation (Clarke et al., 2012). The amount of time allowed for retiring is another related factor. A minimum planning time of two years prior to retirement is related to a positive retirement experience compared with a decision made six months or less prior to retirement (Hardy & Quadagno, 1995). As important as length of time, however, is the quality of retirement planning, which should include not only financial planning but also adequate discussion with the individual's spouse or partner (Noone et al., 2009).

From a sociocultural perspective, individuals with more disposable income or higher income security can, for example, support a more active retirement lifestyle including travel and recreation. People at the high end of the social class scale are less likely to retire than are people at the lower end and the higher-SES individuals tend to retire at a later age. When they do retire, those higher in social class tend to be in better health than are people at lower socioeconomic levels and also have longer life expectancy (Majer et al., 2011). Their advantaged economic security also means that they are better able to take advantage of the opportunities that retirement offers them to engage in productive and enjoyable leisure activities, such as involvement in retirement learning communities and the opportunity to travel. Individuals with higher levels of education and previous experience in managerial or professional positions may be better able to find part-time employment after retirement if they desire it. Past experience in community organizations and activities may also make it easier for these individuals to find rewarding opportunities for unpaid volunteer work and participation in clubs, organizations, and informal networks.

Compared to blue-collar workers, then, individuals in middle-class and higher jobs appear to have greater discretion in retiring when they want to, rather than when they are forced to do so by factors outside of their control (Solem et al., 2016). The dilemma is particularly pressing among European workers with unstable work histories, who may have difficulty remaining employed so they can ensure a comfortable standard of living postretirement (Hofäcker & Naumann, 2015).

Thus, the continuity of an individual's work career is a further influence on the impact of retirement. Those in orderly careers spend the majority of their employed years in a series of related occupations. The higher the extent of orderliness in people's careers, the higher their attachment to their communities, friends, and social activities. The social integration that these individuals maintain during their career eases their retirement transition and means that they are likely to be in better physical and psychological health. Individuals with more continuous work histories also have higher socioeconomic status and income than those in disorderly careers, and these are factors generally related to greater satisfaction with retirement.

A final factor to consider when examining variations in preretirement characteristics of older workers relates to the role of intrinsic factors in work motivation. As identified in a study of French-Canadian teachers (Houlfort et al., 2015), there is a type of passion that is beneficial for retirement adjustment and one that is not. In "harmonious" passion, work becomes part of an individual's identity and fits, most closely, the idea of autonomous work motivation. In "obsessive" passion, the individual needs work to validate his or her self-esteem. Having harmonious passion for work, among these teachers, positively predicted retirement adjustment; the converse was true for obsessive passion. Thus, the ways in which work satisfies an individual's needs seem to play an important role in influencing the impact that retirement has on that individual's sense of well-being. When work is seen as important for maintaining self-esteem, then, the loss of the role will be more devastating than when work is seen as an expression of personal identity

There has been somewhat of a debate in the literature concerning the effect of retirement on a married couple's relationship. One school of thought describes the "spouse underfoot syndrome," whereby partners are more likely to experience conflict now that they are in each other's presence for most of the daytime and nighttime hours (the spouse who is underfoot is typically the husband). However, there is a contrasting view of retirement as a second honeymoon, in which couples are now free to enjoy each other's company on a full-time basis, without the constraints presented by the need to leave home for eight or more hours a day. The couple may benefit from improved health of the retired spouse, although there is no evidence that this improved health has a spillover effect on the partner (Messe & Wolff, 2019).

Shedding light on this debate, there is evidence that men and women engage in more equitable division of household tasks than they did prior to retirement. The convergence of the gender gap in everyday chores after retirement may be one of the factors that helps to promote a couple's feelings of satisfaction with retirement as a whole (Leopold & Skopek, 2015).

The factors that influence retirement adjustment do appear to differ between women and men. Men operate according to the "usual" mode of retirement view, in which decisions regarding retirement do not involve the family. According to the **new modes of retirement** perspective, the characteristics of the person's spouse and lifelong family responsibilities play a role in retirement decisions and adjustment. Current cohorts of older women are more likely to operate according to the new modes of retirement; they are more likely than men to be influenced by the health, financial security, and work status of their spouse. However, among couples raised with more egalitarian values, both are likely to be influenced increasingly by the work status of their spouse (Pienta, 2003).

Given the increase in the size of the retirement population and the increase in life expectancy, there is reason to expect that the field of retirement planning will continue to show strides. The resource model provides an excellent framework for such developments, as retirement planners must take into account not only an individual's financial situation but also the intersection of health, psychological, and sociocultural factors (França & Hershey, 2018). Retirees still wish to "matter" even though they may have given up their role in the workplace (Froidevaux et al., 2016).

LEISURE PURSUITS IN LATER ADULTHOOD

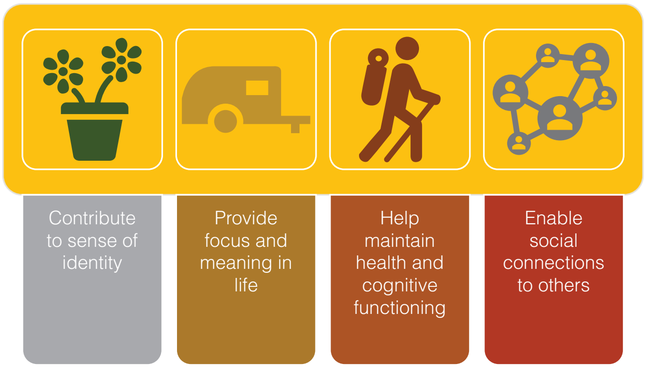
Throughout adulthood, people express themselves not only in their work lives but also through their hobbies and interests. Occupational psychologists and academics studying the relationship between job characteristics and satisfaction often neglect the fact that, for many adults, it is the off-duty hours rather than the on-duty hours that contribute the most to identity and personal satisfaction. In contrast, marketers recognize the value of developing promotional campaigns that appeal to the aging baby boomers who potentially have resources to spend on leisure pursuits (Ferguson & Brohaugh, 2010).

As people move through adulthood and into retirement, it becomes more crucial for them to develop leisure interests so that they will have activities to engage in during the day to provide focus and meaning in their lives. In addition, leisure pursuits can serve important functions by helping older adults maintain their health through physical activity and their cognitive functioning through intellectual stimulation. The social functions of leisure are also of potential significance, particularly for people who have become widowed or have had to relocate due to finances, a desire for more comfortable climates, or poor health. These functions are summarized in Figure 10.11.

That regular leisure-time physical activity can have important health benefits was shown in a longitudinal study in Sweden that followed men over five time points (Byberg et al., 2009). Participants were asked about their level of physical activity with questions such as "Do you often go walking or cycling for pleasure?" People who engaged in physical activity in their leisure time died at later ages than those who did not over the 35-year period of the study. Another follow-up in Sweden of

FIGURE 10.11

Functions of Leisure Pursuits in Adulthood


Contribute to sense of identity
Provide focus and meaning in life
Help maintain health and cognitive functioning
Enable social connections to others

Leisure pursuits can play important roles throughout life, but particularly in retirement.

over 1,800 men and women aged 75 and older showed that the protective effect of physical activity on mortality continued into the 90s, an effect enhanced by engaging in other healthy lifestyle behaviours, particularly not smoking (Rizzuto et al., 2012).

The impact of leisure activities on health also extends to a reduced risk of neurocognitive disorder, including Alzheimer's disease (Tolppanen et al., 2015). These benefits also include stress reduction, thus helping to support immune functioning (Lin et al., 2012).

Travel is a leisure activity that often takes people out of their comfort zone and can therefore stimulate these benefits. Using responses from Israeli participants in a mail-in survey reporting on their most recent vacations involving travel, Nimrod and Rotem (2012) defined a group of "absolute" innovators (the most extreme) who were most likely to say that they took the trip in order to participate in new activities, try new food, learn something new about their relationships, gain a new skill, and learn something new about themselves and life in general. This group, comprising about one-fifth of the sample, shared many similarities with the non-innovators in the activities engaged in while travelling. However, the groups differed in some of the activities they engaged in while on vacation. The innovators were more likely to visit small towns and villages rather than big cities, getting to know the local people, gambling, and engaging in physical exercise, and using travel to find opportunities for growth and self-expression. Unlike the non-innovators, the absolute innovators used travel to find opportunities for growth and self-expression. Clearly, retirement involving such active leisure-time pursuits can facilitate the individual's overall well-being even long after the vacation is over.

Digital gaming is also becoming more popular among older adults. In their summary of the research, Kaufman and Sauvé (2020) reported that about half of older Canadians had played a digital game in the past year and the vast majority in this group (88 percent) had played one day or more per week. Clearly, these games have physical, cognitive, and social benefits. For example, Nintendo Wii combines play with movement and there are games for fall prevention. Games such as Tetris and Medal of Honour can improve cognitive function. Online games with others or games with virtual opponents can enhance social connectedness, and games with younger family members have the potential to strengthen intergenerational relationships (Kaufman & Sauvé, 2020).

Harkening back to activity theory, maintaining an active social life in retirement seems to have a variety of benefits in promoting retirement adjustment. Among a sample of Australian retirees, those who participated in a wider variety of social activities had higher levels of positive affect and, importantly, were higher in their self-efficacy and feelings of mastery (Earl et al., 2015).

In conclusion, changes in the labour force, the meaning of work, and the economic realities of an aging population all affect the nature of work and the workplace. As you contemplate your future career, your top priority should be thinking about what you will find to be most fulfilling.

SUMMARY

1. Work is a major focus of adult life from the 20s until retirement and beyond. Labour force age dynamics have shifted with movement of the baby boomer generation and the aging of the labour force. There are disparities by race and gender in income levels, even controlling for educational attainment.
2. Contemporary vocational psychology is oriented primarily around Holland's RIASEC theory of vocational development, which is the basis for O*NET, a comprehensive catalogue of occupations. The highest level of worker satisfaction and productivity is theorized to occur when there is congruence between persons and their environments. Super's self-concept theory proposes that individuals move through several stages of career development, in which they attempt to maximize the expression of their self-concept in their work. Rather than proceed straight through these stages, however, individuals may plateau at the maintenance stage or recycle through earlier stages after a career change. The ideas of vocation as a calling and the boundaryless and protean careers provide support for the need to view career development from more than a life-stage perspective.
3. Theories and research on vocational satisfaction attempt to determine the relative influence of intrinsic and extrinsic factors on workers' happiness and productivity in a job. Occupational reinforcement patterns are the work values and needs that are likely to be satisfied in a job, and if these are present, the individual will be more satisfied. Self-determination theory proposes that the greatest job satisfaction occurs when needs for competence, autonomy, and relatedness intersect. Conflict between work and family is a source of potential vocational dissatisfaction. There is not a clear-cut relationship between age and job satisfaction, but job tenure appears to play an important role as do factors related to the nature of the work environment.

4. The question of whether older workers are as productive as younger workers is another focus of occupational research. There is a balance between the factors that predict improved performance and those that predict declines in performance. In general, older workers are disadvantaged when a job places heavy demands on speed and physical strength and perform better when their organization's culture allows them to collaborate and use their expertise.
5. Retirement is defined as the individual's withdrawal from the labour force in later life. Rather than being a discrete event, however, for most people, it spans a process that may last for years. Most retired people do not suffer a loss of health, either mental or physical, but some do experience the transition as stressful. The resource model of retirement proposes that people will be most satisfied in retirement if they can draw on physical, psychological, and social sources of support.
6. Leisure activities can serve a variety of important functions for adults throughout their working lives, but particularly in later adulthood after retirement. Researchers have identified positive effects of leisure involvement on physical functioning, well-being, and ultimately mortality.

11

Mental Health Issues and Treatment

Recognizing mental health issues in older adults can be difficult since the symptoms are often attributed to the aging process. Here are some warning signs to watch out for indicating that older adults may need to seek mental health treatment.

AGEFEED

#warningsigns

1. Changes in **mood**
2. **Memory** loss
3. Change in **sleep habits**, such as difficulty sleeping or sleeping too much
4. Sudden decrease or increase in **appetite**
5. **Anger** or **irritability**
6. Inability to experience **positive emotions**
7. Feelings of **restlessness**
8. **Withdrawal** from family and friends
9. Engaging in **risky** behaviours
10. Difficulty maintaining **daily routines**

Up until this point in the book, we have focused primarily on people who fit the definition of "normal" as they navigate the adult years. We will now turn our attention to psychological disorders and how they affect individuals throughout their lives. By some accounts, over half of the entire adult population struggle with the symptoms of one or another disorder. However, it is important to keep in mind that the difference between normal and abnormal is often a matter of degree. Furthermore, psychological disorders reflect developmental processes that continue throughout life. Researchers are beginning to identify the roots of later life psychological disorders in early childhood traumatic experiences. Approximately one-third of older adults report some form of early trauma, such as parental psychopathology, physical or psychological abuse, and other traumatic life events. Having just one of these experiences increases significantly the odds of developing a psychological disorder, including substance use disorder (Rhee et al., 2019). From a biopsychosocial perspective, then, the balance of risk and protective factors as they evolve earlier in life have a cumulative impact in later adulthood (Whitbourne & Meeks, 2010).

PSYCHOLOGICAL DISORDERS IN ADULTHOOD

The criteria used to judge behaviour as "abnormal" include feeling personal or subjective distress, being impaired in everyday life, causing a risk to the self or other people, and engaging in behaviour that is socially or culturally unacceptable (Whitbourne, 2019). **Psychological disorders** include the range of behaviours and experiences that fall outside of social norms, create adaptational difficulty for the individual on a daily basis, and put the individual or others at risk of harm. People who have a hobby of collecting coins would not be considered abnormal, for example, because they are engaging in a behaviour that does not hurt them or others and is culturally acceptable. By contrast, consider people known as "hoarders," who collect old newspapers, magazines, and cereal boxes to the point that their homes become virtually uninhabitable. These individuals might very well be considered to have a psychological disorder: they are not only engaging in behaviour that is outside the norm, but also may be putting themselves and others at risk for fire, injury, or disease because of the dirt and debris that have accumulated in their homes.

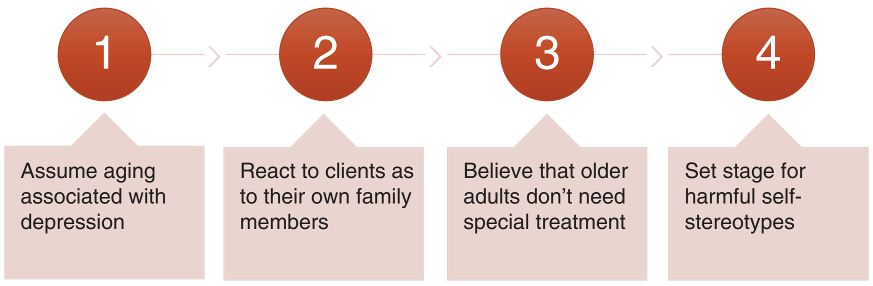
Clinicians diagnose people with psychological disorders using criteria set forth in the **Diagnostic and Statistical Manual (DSM)**, which is the major reference used by mental health professionals in the United States and Canada to diagnose people with psychological disorders. Outside the United States and Canada, clinicians and researchers use the **International Statistical Classification of Diseases and Related Health Problems (ICD)**, the reference guide to both physical and psychological disorders.

The DSM has undergone numerous revisions since first introduced in 1952. The most recent version is the DSM-5 (American Psychiatric Association, 2013). As thorough as this manual is, it unfortunately does not address the fact that a number of psychological disorders are expressed differently in older adults, particularly those who also have medical conditions. Consequently, older adults may not receive treatment that reflects state-of-the-art approaches based on research on mental health and aging.

Lacking specific guidance from the diagnostic manual, health care professionals working with older adults may be caught up in ageist attitudes that affect their work (Whitbourne & Martins, 2020). As we summarized in Figure 11.1, one misguided assumption service providers may hold is that aging is automatically associated with poor mental health, particularly depression. Consequently, when older adults express symptoms of depression, a mental health professional may not regard these as either unusual or treatable. Second, it is likely that mental health professionals are younger than older adults they serve, leading to the possibility that they react to their clients in the same way, for better or worse, as they do to their own family members. As a result, older adult mental health patients may not get the benefit of the objectivity required of a treating professional.

Another way that ageism may affect service providers, as shown in Figure 11.1, is that they believe that older adults are no different than their other patients. As a result, the clinicians may fail to take into account special considerations relevant to aging, such as the co-occurrence of mental health issues with physical changes or chronic diseases.

Finally, the ageism that can affect service providers can also affect older adults with mental health needs. The patients themselves may feel that symptoms of depression or anxiety are a natural part of the aging process, and so they do not seek treatment when they develop what would otherwise be treatable conditions (Wuthrich & Frei, 2015). Apart from the problems



1
2
3
4
Assume aging associated with depression
React to clients as to their own family members
Believe that older adults don't need special treatment
Set stage for harmful self-stereotypes

FIGURE 11.1

Ageism and Its Effect on Service Provision

Prior to considering specific psychological disorders, it is worth pointing out these general biases that can limit mental health interventions with older adults.

involved with ageism in service provision, affecting both older adults and treatment professionals, diagnosis of psychological disorders in older adults can be made more complicated by inaccurate symptom reporting by older adults. Their disorders may also be misdiagnosed because the symptoms of a psychological disorder occur in conjunction with a medical condition. Finally, adding to the problem, health professionals that serve older patients may fail to detect and treat psychological disorders, or refer them for mental health services.

Typically, as is the case for all age groups, public health care plans provide limited reimbursement for the treatment of mental health problems. Waiting times for public mental health services can be long, and the cost of seeing a private mental health professional is prohibitive for many people, especially those on fixed incomes like many older adults. As a result, many mental health problems among the elderly that could be prevented, had they been diagnosed early and treated appropriately, are left undetected. In general, the mental health system places more emphasis on treatment of mental illness than prevention and health promotion, which receive only a small fraction of the total budget for mental health care (which is small to begin with). Recognizing the gap, the Mental Health Commission of Canada has published guidelines for comprehensive mental health services for older adults and a review of best practices on this topic (MacCourt et al., 2011; Mental Health Commission of Canada, 2019).

Major Depressive Disorder

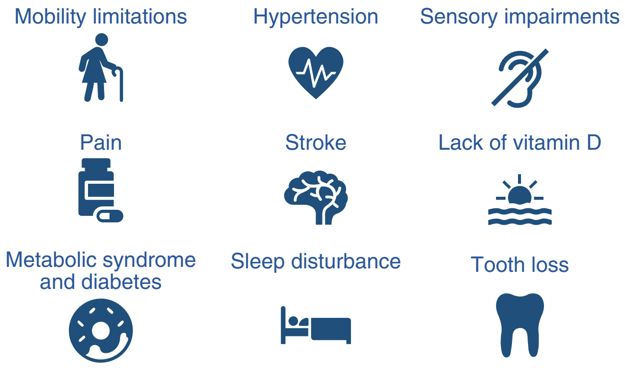
Individuals who experience prolonged and extreme sadness may be diagnosed with a form of depressive disorder, depending on the length and nature of the symptoms. In **major depressive disorder**, the major symptoms are an extremely sad mood that lasts most of the time for at least two weeks and is not typical of the individual's usual mood and/or a loss of interest or pleasure in most activities for most of the day. The individual may also experience other symptoms, including appetite and sleep disturbances, feelings of guilt, difficulty concentrating, a change in activity, fatigue or loss of energy, and a low sense of self-worth. They may also have suicidal ideation.

Though the prevalence of a diagnosable mood disorder is lower in older than in younger adults, many older adults report symptoms of depressive disorders. Among a sample of nearly 2,000 women aged 60 to 91 years, the rates of subclinical depression were estimated at 20 percent. However, among those seen in medical settings, such as inpatient hospitals or clinics, the rates of depressive symptoms can reach as high as 30 percent (Whitbourne & Meeks, 2010). Moreover, although women are more likely to experience the diagnosable condition of major depressive disorder, depressive symptoms are higher in men between the ages of 60 and 80. By that point, the rates of depressive symptoms in women and men are roughly equal (Patten et al., 2016).

There are age differences in the symptoms of depression, and what appears as a depressive symptom for a younger adult may not appear as one in an older adult. The traditionally recognized "psychological" symptoms of depression, such as **dysphoria** (sad mood), guilt, low self-esteem, and suicidal thoughts, are less likely to be acknowledged by older adults.

FIGURE 11.2

Contributors to Depression in Later Adulthood



A variety of physical conditions can contribute to the experience of depression in older adults.

When trying to determine the cause of an older adult's depression, it is important for health care workers to look for possible contributing factors (Figure 11.2). These can include mobility limitations and pain due to musculoskeletal-related illnesses, including arthritis (Rathbun et al., 2019) and hip fracture (Liu et al., 2018). The chronic conditions of metabolic syndrome, diabetes, and hypertension can also increase the risk of depression in older adults (Kokkeler et al., 2019), as can stroke (Xekardaki et al., 2012). Sensory impairments, sleep disturbance, tooth loss (Rouxel et al., 2017), and deficiency in vitamins D and K are additional risk factors for depression in older adults (Bolzetta et al., 2019). Finally, individuals living in long-term care institutions are also at greater risk for depression (Chau et al., 2019).

Not only do physical conditions increase the risk of major depressive disorder, but older adults become more likely to suffer further impairments in physical and cognitive functioning when their psychological symptoms are untreated (Olaya et al., 2019). Depressive symptoms predict mortality in older adults (Saeed Mirza et al., 2018). In one large-scale study of older adults living in the community followed for over 13 years, those with both depressive symptoms and diabetes had higher rates of mortality, reflecting higher levels of C-reactive protein (Castro-Costa et al., 2019).

Bipolar Disorder

Bipolar disorder is diagnosed in people who have experienced one or more manic episodes in which they feel elated, grandiose, expansive, and highly energetic. Formerly called manic depression, people with bipolar disorder may or may not have experienced a period of significant depression along with being manic for at least a week (bipolar I) or may have experienced depression and at least one "hypomanic" episode, in which their manic symptoms lasted for less than a week (bipolar II).

Researchers know considerably less about bipolar disorder in later life than they do about major depressive disorder (Dols et al., 2016). Estimates are that rates of bipolar disorder are relatively low in older adults, affecting 0.5 to 1.0 percent of the over-65 population (Sajatovic et al., 2015). Older adults with bipolar disorder have shorter life expectancies due to the higher co-occurrence, in this population, of other physical illnesses, but the cause for this association is not yet known (Colpo et al., 2015).

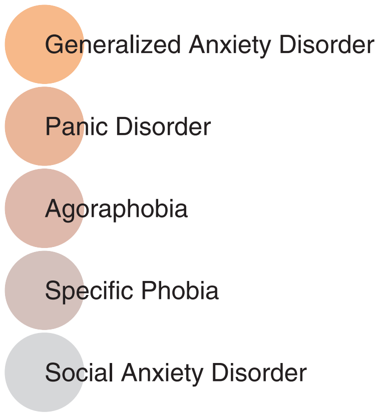
Bipolar disorder exacts a high psychosocial cost on those who have experienced its symptoms throughout their lives. For example, older adults with a lifetime history of "rapid cycling," in which their symptoms alternate frequently between depression and mania, feel that their life goals were significantly interfered with if not entirely derailed (Sajatovic et al., 2008). Fortunately, lithium carbonate, the treatment of choice in bipolar disorder, appears highly effective in older adults (Fotso Soh, 2019). Additionally, older adults with bipolar disorder can benefit from a "prudent" lifestyle in which they avoid alcohol and smoking while also maintaining healthy weight and levels of physical activity (Almeida et al., 2018).

Anxiety Disorders

The main characteristic of an **anxiety disorder** is anxiety, a sense of dread about what might happen in the future. In addition to having the unpleasant feelings associated with anxiety, people with anxiety disorders go to great lengths to avoid anxiety-provoking situations. As a result, they may have difficulty performing their jobs, enjoying their leisure pursuits, or engaging in social activities with their friends and families. The forms of anxiety disorder are shown in Figure 11.3. The implications of failing to diagnose anxiety disorders can be serious, as older adults with anxiety symptoms have higher rates of mortality, particularly among African American older adults (Brenes et al., 2007).

FIGURE 11.3

Forms of Anxiety Disorder



These are the five major forms of anxiety disorder, with specific phobia having the highest prevalence followed by social anxiety disorder.

In the anxiety disorder known as **generalized anxiety disorder**, the individual experiences an overall sense of uneasiness and concern without specific focus. People who have this disorder are very prone to worrying, especially over minor problems. They may also have additional symptoms, such as feeling restless and tense, having trouble concentrating, being irritable, and having difficulty sleeping.

The form of anxiety disorder known as **panic disorder** involves the experience of panic attacks, in which people have the physical sensation that they are about to die (e.g., shortness of breath, pounding heart, and sweating palms). People who suffer from a panic disorder may have these episodes at unpredictable times. Individuals may also experience **agoraphobia**, the fear of being in an open or crowded space, or of being in a space from which escape is difficult. People with agoraphobia avoid places such as elevators, shopping malls, or public transportation, where escape during an attack would be difficult.

The diagnosis of **specific phobia** is based on the individual having an irrational fear of a particular object or situation. Almost any object or situation can form the target of a specific phobia. People can have phobias of anything from driving to syringes. The four categories of specific phobias include animals, the natural environment (storms, heights, and fires), blood-injection-injury (seeing blood, having an invasive medical procedure), and engaging in activities in particular situations (driving, flying, and being in an enclosed space). A fifth category of specific phobias includes a variety of miscellaneous stimuli or situations, such as a child's fear of clowns or an adult's fear of contracting a particular illness. You may have your own particularly bothersome situations or stimuli, but to be diagnosable, they must be severe enough to interfere with your everyday functioning.

In **social anxiety disorder**, the individual experiences extreme anxiety about being watched by other people. The term, which was formerly called social phobia, is somewhat misleading in that it is not literally a fear of other people but a fear of being publicly embarrassed or made to look foolish. People with social anxiety disorder not only have difficulty in situations where they are actually being judged but also in situations that they believe involve the potential for judgement such as eating in the presence of other people.

Estimates are that anxiety disorders have a 12-month prevalence rate of 17.2 percent among those 65 and older. Agoraphobia is the most frequently reported anxiety disorder (4.9 percent), followed by panic disorder (3.8 percent), animal phobia (3.5 percent), general anxiety disorder (3.1 percent), and social anxiety disorder (1.3 percent). Women are twice as likely to be diagnosed with agoraphobia or general anxiety disorder compared to men (Canuto et al., 2018).

As is true for mood disorders, older adults may be reluctant about reporting their symptoms, or they may genuinely not realize that their symptoms are due to anxiety. Thus, they may report having somatic complaints rather than the experience of anxiety. Furthermore, as is true for mood disorders, older adults with anxiety disorders may actually have a medical condition that masks the anxiety symptoms or, conversely, exacerbates them. Furthermore, it is important to distinguish between disorders that first appear in later life and those that have persisted for years, if not decades. For example, an older adult living in a high-crime neighbourhood may develop anxiety based on the fear of being victimized. As is true with depression, furthermore, health-related conditions can contribute to the experience of anxiety.

Obsessive-Compulsive and Related Disorders

People who experience **obsessive-compulsive disorder** suffer from obsessions, or repetitive thoughts (such as the belief that one's child will be harmed) and compulsions, which are repetitive behaviours (such as frequent hand washing). The obsessions and compulsions are unrelenting, irrational, and distracting. The most common compulsions involve repeating a specific behaviour, such as washing and cleaning, counting, putting items in order, checking, or requesting assurance. Compulsions may also take the form of mental rituals, such as counting up to a certain number every time an unwanted thought intrudes.

Among older adults, the one-month prevalence of obsessive-compulsive disorder is estimated to be 2.9 percent, but another 21 percent have obsessive-compulsive symptoms. Older adults with obsessive-compulsive disorder also appear to be more likely to be diagnosed with depression. Individuals whose symptoms include checking appear to have poorer memory than those with other symptoms, suggesting that there may be a cognitive component to this form of the disorder (Klenfeldt et al., 2014).

In the related disorder known as **hoarding**, people collect and store seemingly useless items that they cannot discard. You may have older adult relatives or neighbours who have a large number of items stored away in closets, garages, basements, or attics. People who have a lifetime of accumulated objects may very reasonably run out of room for their belongings, mementos, tools, or cooking-related objects. In hoarding disorder, the items can be as insignificant as outdated newspapers, mail, shopping bags, empty food containers, and even food remnants. People with hoarding disorder cannot dispose of these items because they are convinced that they will need them later, even though they have no clear utility. Their hoarding goes beyond a mere collecting or inability to dispose of precious mementos when accumulation of these objects threatens their health and safety.

The symptoms of hoarding disorder appear to worsen over the years of adulthood. Although some individuals begin to show evidence of hoarding in their teenage years, nearly one-quarter first become hoarders after the age of 40. Regardless of when the symptoms appear, the severity of the hoarding becomes worse over time (Dozier et al., 2016).

Trauma and Stress-Related Disorders

Exposure to trauma, such as an earthquake, fire, physical assault, and war can lead individuals to experience symptoms that may last for a prolonged period of time, even after the trauma subsides. These symptoms include intrusion of distressing reminders of the event, dissociative symptoms such as feeling numb or detached from others, avoidance of situations that might serve as reminders of the event, and hyperarousal, including sleep disturbances or irritability. People are diagnosed with **acute stress disorder** if they experience these symptoms for up to a month after the trauma. The diagnosis of **post-traumatic stress disorder (PTSD)** is given to people whose symptoms persist for more than a month.

The symptoms of PTSD and related disorders, such as depression, can persist for many years. In a study of nearly 5,600 male veterans, those 60 years and older who were in the theater of operations were found to have a lifetime prevalence of 17 percent, compared to 6 percent who were not exposed to combat (Goldberg et al., 2016). As they age, combat veterans may be more vulnerable to current stressors, suggesting that prior exposure to traumatic events sensitizes older adults to difficulties they encounter in later life (Sachs-Ericsson et al., 2016). Supporting the value of a life-span perspective, findings from the Veterans Administration Normative Aging Study suggest that veterans with supportive environments in their childhood are less likely to experience PTSD symptoms after exposure to combat (Kang et al., 2016).

PTSD may also develop in older adults exposed to other forms of trauma including motor vehicle collisions (Platts-Mills et al., 2017), imprisonment (Flatt et al., 2017), and employment in emergency services such as firefighting (Milligan-Saville et al., 2017). Natural disasters present another risk for PTSD among older adults, as was the case in a study of Hurricane Sandy (New Jersey) survivors, although high levels of social cohesion were found to buffer against the development of symptoms (Heid et al., 2017).

Older adults with PTSD are at risk not only for the psychological consequences of the disorder but also for poorer physical health, including metabolic syndrome (Wolf & Schnurr, 2016). PTSD may also be associated with accelerated aging as indicated by shorter telomere length (Lohr et al., 2015) as well as with increased risk for developing neurocognitive disorders (Clouston et al., 2019).

The symptoms of PTSD may take decades to emerge after an individual has been exposed to trauma. **Late-onset stress symptomatology (LOSS)** refers to a phenomenon observed in aging veterans who were exposed to stressful combat situations in young adulthood and are now re-examining their past wartime experiences (Brady et al., 2019). Symptoms related to the combat experiences (such as an increase in memories of the trauma) begin to emerge in later life, perhaps as a function of exposure to stresses associated with aging, such as retirement and increased health problems (Davison et al., 2006). Symptoms of LOSS are similar to those of PTSD, but the progression is distinct, in that it develops later in life and may exist at levels below the threshold for a PTSD diagnosis (Potter et al., 2013).

Schizophrenia and Other Psychotic Disorders

The term **schizophrenia** refers to a disorder in which individuals experience distorted perceptions of reality and impairment in thinking, behaviour, affect, and motivation. Individuals with schizophrenia do not experience these symptoms continuously, but to receive the diagnosis they must have displayed them for a significant period of time during a one-month period.

The types of symptoms people with schizophrenia experience include delusions (false beliefs), hallucinations (false perceptions), disorganized and incoherent speech, very unusual motor behaviour, and what are called the "negative" symptoms of apathy, withdrawal, and lack of emotional expression. While their symptoms are active, they are unable to get or hold onto a job, remain in a relationship, or take care of themselves. These symptoms must have lasted for six months or more, and the individual must not have another diagnosis (such as drug or alcohol abuse) that could better explain the symptoms. In addition to providing the overall diagnosis, clinicians use rating scales that are new to the DSM-5, in which they evaluate the severity of each of these types of symptoms.

Epidemiologists estimate that 1 percent of the population has schizophrenia at some point in life, with higher rates for adults age 30 to 44 (1.5 percent) than for people older than 65 (0.2 percent) (Keith et al., 1991). The 12-month prevalence is estimated at 0.5 percent (Wu et al., 2006). In part, the apparent decrease in older age groups reflects the fact that some people with this disorder do not survive until old age.

Lifestyle factors lead individuals with schizophrenia to have higher rates of mortality. In a six-year longitudinal study of over 1 million patients with schizophrenia between the ages of 20 and 64, mortality rates were more than 3.5 times the rate for adults in the general population. The majority of these deaths were related to use of tobacco, alcohol, and other drugs that led to cardiovascular and respiratory diseases as well as higher rates of accidental deaths (Olfson et al., 2015). Additionally, 15 percent of individuals with schizophrenia die as a result of suicide, and up to 50 percent make a suicide attempt at some point in their lives (Harvey & Bowie, 2013).

Compared to other psychological disorders, the course and outcome of schizophrenia are poorer (Jobe & Harrow, 2010). During the first 10 to 15 years, people with schizophrenia have more recurrent episodes, and their chances of completely recovering, even after the first 10 years, are worse than those of people with other disorders. Most people continue to experience psychotic symptoms and disordered thinking, as well as negative symptoms. They are less able to obtain or keep a job. On the positive side, however, if they receive treatment during the acute phase, as many as half may recover or experience significant improvement (Vita & Barlati, 2018). The long-term outcomes are somewhat poorer for individuals whose symptoms are considered "negative," in that they involve apathy and lack of ability to experience emotions (Ventura et al., 2015).

A debate in the literature involves a condition known as **late-onset schizophrenia**, a form of the disorder originating in adults over the age of 45. Individuals who develop symptoms of schizophrenia late in life appear to be influenced less by the factors that lead to schizophrenia in younger adults, including heredity, and more by psychosocial stressors such as unemployment (Chen et al., 2018). The question remains, however, as to whether the schizophrenia that develops late in life is a fundamentally different subtype than earlier onset schizophrenia (Cohen, 2018).

Substance-Related Disorders

The majority of adults who abuse or are dependent on alcohol or illicit drugs are in their late teens and early 20s; however, the overall numbers and percentages of older adults are on the rise with the aging of the baby boom generation.

Substance use disorders involve the use of alcohol and/or drugs to a degree that causes clinically significant impairment, including health problems, disability, and failure to meet major responsibilities at work, school, or home. Statistics Canada (2013c) estimates that about 1 in 5 Canadians aged 15 and older experiences a substance use disorder in their lifetime.

Alcohol is the most commonly used and misused substance among older adults. One way of examining the extent of the most severe alcohol abuse is by looking at hospitalizations caused entirely by alcohol. As you can see in Figure 11.4, these rates are highest among middle-aged men and, during later life, are comparable to rates among younger people (Canadian Coalition for Seniors' Mental Health, 2019a). At all ages they are higher for men.

Older individuals who abuse alcohol are at risk of developing cirrhosis of the liver (a terminal condition) as well as higher rates of injury due to hip fractures and motor vehicle accidents. Alcohol use is also associated with greater risk of adverse reactions from both psychotherapeutic medications and over-the-counter pain and allergy medications. Individuals with a lifetime history of alcohol use are also at increased risk of developing diabetes, congestive heart failure, osteoporosis, and mood disorders.

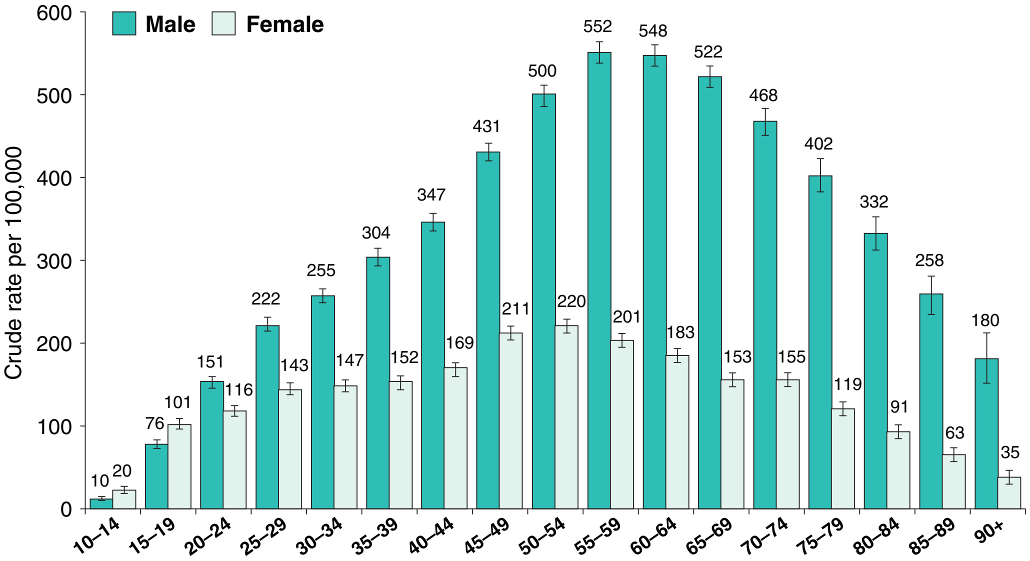
Again, going against what is most likely your view that alcohol abuse is a problem of younger individuals, including those living in college communities, there appear to be relatively high rates of alcohol use in settings in which only older adults live, such as nursing homes and retirement communities (Fishleder et al., 2016). People with a history of problem drinking and those who retired involuntarily seem most likely to abuse alcohol after they enter retirement (Kuerbis & Sacco, 2012).

Long-term alcohol abuse may lead older adults to develop neurocognitive disorders, as we discussed in Chapter 5. However, among otherwise neurocognitively healthy older individuals, the long-term effects of alcohol use may depend on other factors as well, particularly education, sex, age, race, and smoking history (Kalapatapu et al., 2017). As we have seen before, smoking is a lifestyle factor that interacts with other threats to the health of older adults. Alcohol use still involves risks for older adults, but the role of smoking must be taken into account when examining effects on cognition.

Cannabis use is less common among those 65 years of age and older at 7 percent, compared to 10 percent at ages 45 to 64, 25 percent at ages 25 to 44, and 26 percent at ages 15 to 24. However, data collected after the legalization of cannabis use indicate that rates of use among those 65 and above have increased at a much higher rate compared to other age groups, from 40,000 reported users in 2012 to 400,000 in 2019 (Statistics Canada, 2019m). As indicated in Figure 11.5, the frequency of cannabis use is lower among older Canadians,

FIGURE 11.4

Crude Rates for Hospitalizations Entirely Caused by Alcohol per 100,000 Population Age 10+, by Age Group and Sex, 2015–2016



Men are more likely to be hospitalized for alcohol abuse and this peaks between the ages of 55 to 64.

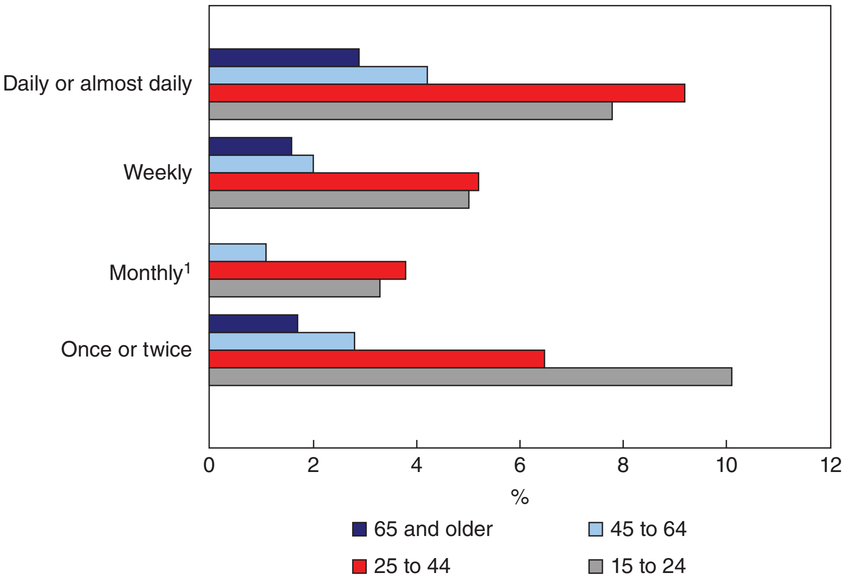
Source: Canadian Coalition for Seniors' Mental Health. (2019a). *Canadian guidelines on alcohol use disorder among older adults*. Markham, ON: Author. Retrieved from https://ccsmh.ca/wp-content/uploads/2019/12/Final_Alcohol_Use_DisorderV6.pdf

with daily or almost daily use being highest among those age 25 to 44 and lowest among those 65 years and older. It is likely that some proportion of the oldest group is using cannabis for medicinal purposes. With the legalization of cannabis and more permissive attitudes towards its use, rates of cannabis use may be higher in future generations of older Canadians.

Among the illicit drugs, the opioid crisis in Canada has received the most attention largely due to the high use of prescription opioids and the dangers of a supply that is contaminated by synthetic opioids like fentanyl. As of June 2020, there were 15,393 apparent opioid-related deaths in Canada, with Western Canada being the most affected region of the country. In 2019, 94 percent of these deaths were unintentional and 77 percent involved fentanyl (Public Health Agency of Canada, 2020). Older adults are particularly susceptible to opioid addiction due to high rates of chronic pain and the

FIGURE 11.5

Frequency of Cannabis Use by Age Group, Household Population Aged 15 Years and Older, Canada, Second and Third Quarters Combined 2019



Note: 1. Estimate for seniors who reported using cannabis monthly was rare, making the estimate too unreliable to be published.

The frequency of cannabis use is lower among those 65 years of age and older compared to other age groups.

Source: Statistics Canada. (2019m). *National cannabis survey, third quarter 2019*. In *The Daily*, Wednesday, October 30, 2019. (Catalogue no. 11-001-X). Retrieved from https://www150.statcan.gc.ca/n1/daily-quotidien/191030/dq191030a-eng.pdf frequent use of opioids to treat pain. Many people are not aware that opioid use can result in increased pain sensitivity, a condition known as opioid-induced sensitivity. Taking an opioid in combination with other, commonly prescribed prescription drugs may result in serious drug interactions.

Although we typically associate opioid-related deaths with younger men and women, 22 percent of these were among people age 50 to 59 and 9 percent were among those 60 years of age and older. Moreover, in Canada, from 2007 to 2015, hospital admissions for opioid overdose were higher among older adults than any other age group, almost double that of those 15 to 24 years of age, and representing 30 percent of all admissions for opioid overdoses (Public Health Agency of Canada, 2020).

Benzodiazepine receptor agonists (BZRAs), often used to treat anxiety, insomnia, and behavioural and psychological symptoms of dementia, are not recommended for older adults due to a decreased ability to metabolize some longer-acting agents and increased sensitivity. Although rates are generally dropping in Canada, high rates of use persist, particularly among older women, at 18.7 percent over the past year (Canadian Coalition for Seniors' Mental Health, 2019b). The use of BZRAs is of great concern due to the risk of dependency and other adverse effects, including falls, fractures, cognitive impairment, delirium, incontinence, respiratory depression, unplanned hospitalization, and driving accidents.

Recognizing that substance use disorders are a growing but neglected issue among older adults, the Canadian Coalition for Seniors' Mental Health has published guidelines and resources for alcohol, benzodiazepine, cannabis, and opioid use disorders. These resources provide helpful evidence-based recommendations for the assessment, treatment, and prevention of substance use disorders, and future directions for research in this area.

In Canada, research on gambling has increased in recent years. Although many older adults enjoy gambling as a social activity, problem gambling is also a concern for some. Prevalence estimates of problem gambling indicate that rates among older adults are similar to those among other age groups (Ariyabuddhiphongs, 2014).

In a study conducted in southwestern Ontario, 2,103 individuals aged 55 and older were recruited from gambling venues (Turner et al., 2018). This recruitment method permitted researchers to get a better sense of the characteristics and vulnerabilities of older problem gamblers. In this sample, 6.9 percent were experiencing severe problem gambling and another 20.3 percent reported moderate gambling problems. Participants spent, on average, 135 hours per year gambling and spent an average of approximately $140 per visit. Severe problem gamblers spent about 23.4 percent of their income on gambling. An interesting finding from this study was that older adults that came to casinos on bus tours often had more gambling problems. Casino tours are routinely organized for older adults, and although they provide social opportunities and entertainment, they are not without their risks. The results of this study suggest the need for problem gambling help information as part of these tours.

Personality Disorders

A **personality disorder** is a long-standing pattern of inner experience and behaviour that has maladaptive qualities. The DSM-5 includes diagnostic criteria for 10 personality disorders, all of which are characterized by significant and chronic difficulties in everyday life. Clinicians diagnosing individuals with personality disorders may also use an optional system in the DSM-5 based on personality traits similar to those in the Five-Factor Model.

Several personality disorders are of particular relevance with regard to aging. Antisocial personality disorder is characterized by **psychopathy**, a set of traits that include lack of remorse and an impulsive lifestyle. The traits associated with psychopathy fall into two dimensions (Hare & Neumann, 2006). Factor 1 is a cluster of traits that represent disturbances in the capacity to experience emotions such as empathy, guilt, and remorse. This cluster also includes manipulativeness, egocentricity, and callousness. Factor 2 incorporates the unstable and impulsive behaviours that contribute to the socially deviant lifestyle of the individual with this disorder.

Older adults diagnosed previously in life with antisocial personality disorder are less likely to exhibit the symptoms associated with the socially deviant and impulsive component of psychopathy (Boudreaux et al., 2019). Rates of criminal offending are known to be lower among older adults (Matthews & Minton, 2018). Figure 11.6 illustrates, among a Canadian population, the lower probability of criminal offenses across adulthood, which is most pronounced for the most frequent crime of common assault (Allen, 2016).

The majority of men showing antisocial behaviour are the so-called "adolescence-limited." Less common are the "life-course persistent" offenders whose antisocial behaviour continues throughout adulthood (Moffitt, 2018). These findings support the view that the developmental course of antisocial personality disorder is to show at least some improvement over time.

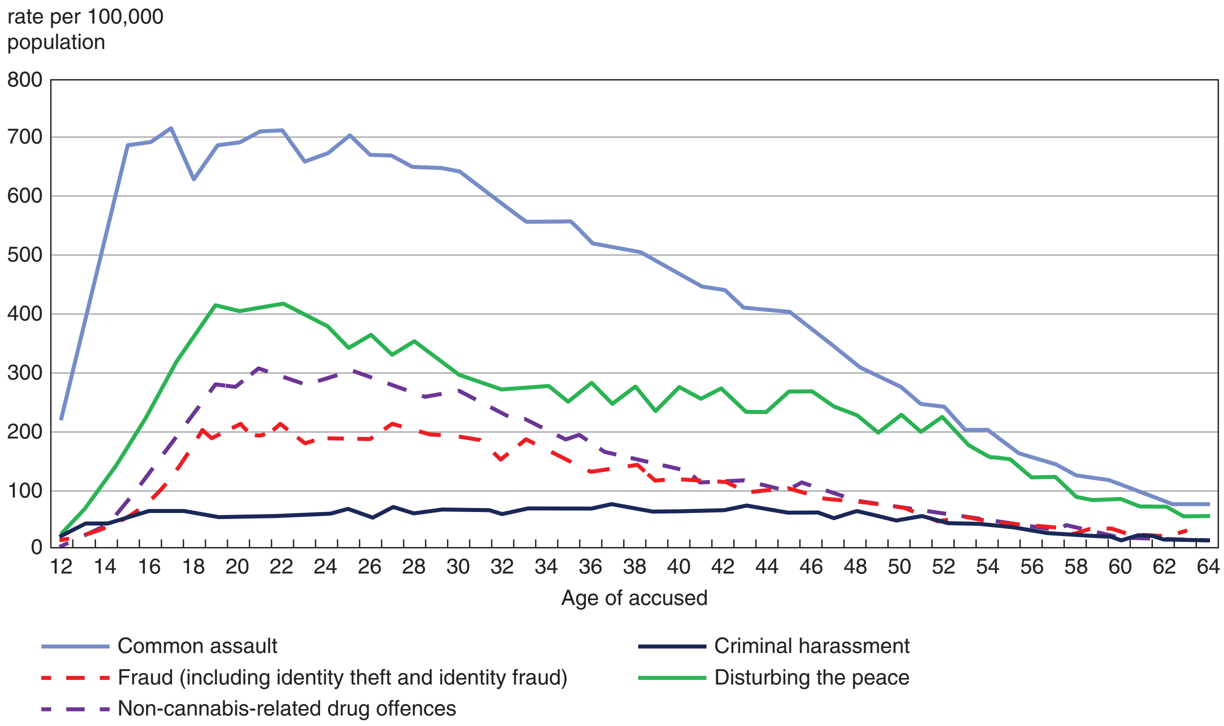
Changes over adulthood in the impulsive and antisocial element of psychopathy may reflect a number of influences other than changes in the personality disorder itself, however. Once again, we return to an explanation involving survivor or attrition effects. The apparent decrease in antisocial behaviour may reflect the fact that people who were high on Factor 2 (impulsivity) of psychopathy are no longer alive. In addition to having been killed in violent crime or due to drug or alcohol abuse, people with antisocial personality disorder have a higher rate of mortality due to suicide, HIV infection (reflecting substance use, needle sharing, and multiple sex partners), cancer, and COPD (Krasnova et al., 2019).

Another personality disorder studied in later adulthood is **borderline personality disorder (BPD)**, a diagnosis given to people who show symptoms that include extreme instability in sense of self and relationships with others, sexual impulsivity, fear of abandonment, repeated suicide attempts, and difficulties controlling their emotions.

The majority of individuals with BPD describe their symptoms as first manifesting in adolescence, if not before the age of 13. The factors associated with increased risk of developing BPD

FIGURE 11.6

Selected Offenses Which Peak During Young Adulthood and Decline Gradually with Age, Canada, 2014



Note: Rates are calculated on the basis of 100,000 population at each age in 2014. Populations are based upon July 1st estimates from Statistics Canada, Demography Division. Accused under age 12 cannot be charged with an offence under the *criminal code*.

Criminal offenses, as based on reporting from Canada, peak in early adulthood.

Source: Allen, M. (2016). *Young adult offenders in Canada, 2014*. (Catalogue no. 85-002-X). Ottawa, ON. Retrieved from https://www150.statcan.gc.ca/n1/pub/85-002-x/2016001/article/14561-eng.htm

include family adversity, limited social resources (wealth and education), psychopathology in the mother, harsh parenting, sexual abuse or neglect, and symptoms of other disorders such as substance abuse.

The symptoms of BPD gradually shift from early to middle adulthood from inability to control emotions, impulsivity, and suicidality to problems in relationships and occasional periods of improvement.

Later adulthood is the least well-investigated period of life with regard to BPD. The results of cross-sectional studies suggest improvements occur in the symptoms relevant to suicidality and impulsivity. However, people who do not recover from BPD are at risk of dying younger and therefore are not part of later life samples. Older individuals with BPD retain the underlying qualities of fear of abandonment, selfishness, lack of empathy, and a tendency to manipulate others. They are also at higher risk for arthritis and heart disease, primarily as a result of increased obesity. Moreover, older adults who remain impulsive, as well as those who are experiencing chronic feelings of emptiness and having unstable relationships, are also at risk for a higher frequency of stressful life events (Videler et al., 2019).

In **obsessive-compulsive personality disorder**, individuals show patterns of behaviour that include excessive rigidity, preoccupation with details and rules, excessive perfectionism, and workaholism. In contrast to the diminution of antisocial and borderline personality disorders in later life, obsessive-compulsive personality disorder shows greater prevalence in older adults (Schuster et al., 2013). Despite what might seem to be a natural link between the personality trait of conscientiousness and this personality disorder, it appears that some of the perfectionistic symptoms of obsessive-compulsive personality disorder can interfere with the component of conscientiousness involving the ability to get things done (Mike et al., 2018). Older adults with this disorder, rather than being healthier due to their sticking to routines, are more likely to suffer from disability and lower quality of relationships as well as depression (Cruitt & Oltmanns, 2018).

Overall, having a personality disorder in later life does not bode well for the individual's ability to navigate the aging process. Even when controlling for current health problems, depression, and health-related behaviours, people in their late 50s and early 60s with personality disorders are more likely to require more medical care. People with borderline personality, in particular, reported experiencing higher levels of pain and fatigue and more negative perceptions of their general levels of physical health (Powers & Oltmanns, 2012).

It is also important to distinguish between the older adult's perception of personality disorder symptoms and the way the individual is actually regarded by other people. Older adults with personality disorders may regard their symptoms as improving, but when others rate their personalities, they provide a more negative and, presumably, realistic assessment (Cooper et al., 2014). One possible explanation for this is a positivity bias also seen in the autobiographical memories of older adults in which they prefer to view themselves and their past in more favourable terms than is warranted (Isaacowitz, 2014).

ELDER ABUSE

The term **elder abuse** is used to refer to a large category of actions taken directly against older adults that inflict physical or psychological harm. Collecting epidemiological data on elder abuse has been hampered by a lack of consensus on the definition and measurement of elder abuse (Roberto, 2016). The 12-month prevalence rate of elder abuse in Canada has been estimated at 7.5 percent, including psychological abuse (2.7 percent), physical abuse (2.2 percent), sexual abuse (1.6 percent), and financial abuse (2.6 percent; NICE, 2015). There is evidence that rates of elder abuse are increasing. From 2009 to 2017, the rates of police-reported family violence against older adults increased by 6 percent, while the rates decreased among child and youth victims (−7 percent) and partner victims (−14 percent). These data represent a year-over-year increase, with family violence against older adults rising 4 percent from 2016 to 2017 (Statistics Canada, 2018a).

Importantly, abuse of older adults is chronically under-reported. Potential barriers to detection include social isolation, dependence on family members for care, embarrassment and reluctance to report abuse, limited professional knowledge and training, lack of screening and detection protocols, fear of liability, and lack of community resources for supporting older victims. The most prominent signs of elder abuse are depression, confusion, withdrawn behaviour, isolation from friends and family, unexplained injuries (bruises, burns, or scars), appearing in need of care (dirty, undermedicated, or dehydrated), having bed sores, and making changes in banking or spending patterns (National Institute on Ageing, 2019b).

There are five types of elder abuse: physical abuse, psychological abuse, financial exploitation, neglect, and sexual abuse (National Institute on Ageing, 2019b). In physical abuse, the older adult is the victim of harm due to slapping, pushing, or hitting. Psychological abuse, also called emotional abuse, involves yelling, threatening, or shunning the older adult and may also include preventing the older individual from contact with close friends and family members. Financial abuse involves the exploitation of older adults through such tactics as scamming, selling overpriced products, or taking over and draining credit cards or savings accounts (see Figure 11.7). Neglect is the form of elder abuse in which the individual does not attempt to respond to the older adult's needs such as food, water, clothing, shelter, medicine, and safety. Finally, sexual abuse occurs when a caregiver forces an older adult to watch or be part of a sexual act.

Risk factors with unanimous or near-unanimous support include shared living situation, social isolation and poor social networks, dementia (for physical abuse), and, among the perpetrators, mental health problems (primarily depression), hostility, alcohol abuse, and dependency on the mistreated older adult (NICE, 2015). Interestingly, there is evidence that elder abuse is a life-long process as having been abused as a child, youth, or middle-aged adult emerged as the second strongest risk factor in a representative sample of 8,163 Canadians 55 years of age and older (NICE, 2015).

Mandatory reporting laws for elder abuse do not exist in Canada, beyond legislation designed to protect those who receive provincially funded care or support services (e.g., Alberta's Protection for Persons in Care Act). Instead, Bill C-36, Protecting Canada's Seniors Act, was passed in 2012. Described as a largely symbolic piece of legislation, it addresses

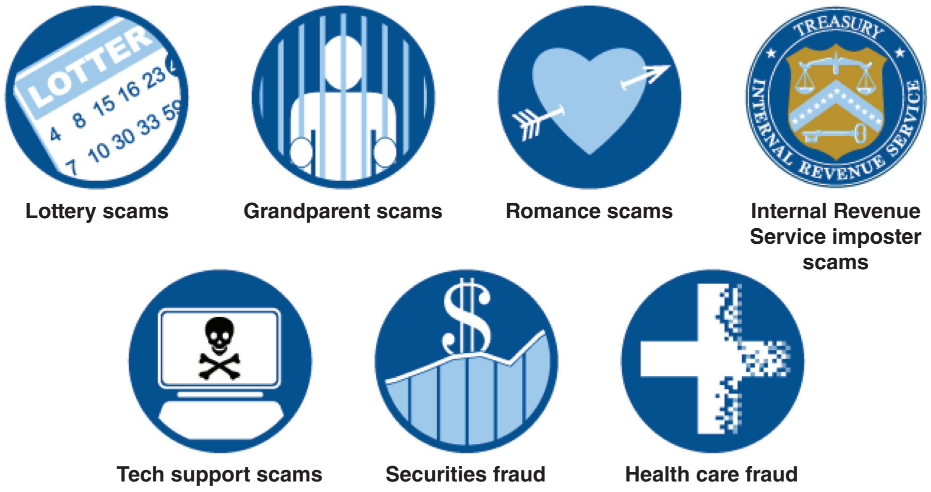


FIGURE 11.7

Forms of Financial Abuse for Which Older Adults Are at Risk

Source: From GAO analysis of information from the U.S. Senate Special Committee on Aging, Department of Justice, Department of State, and Department of Treasury. — GAO-19-365. Public Domain.

only the most egregious forms of abuse, overlooks the hidden nature of elder abuse, fails to acknowledge that victims are often dependent and do not want their relatives locked up, and neglects the systemic issues that can lead to elder abuse, such as lack of support for caregivers (Linden & Groh, 2013).

Researchers agree that there are, as yet, few evidence-based approaches to prevent elder abuse and treat its victims, though it appears that a focus on caregivers will be the key to successful interventions. Many caregivers who engage in abuse are not necessarily bad people but are people caught in very difficult circumstances (Sibbald & Holroyrd, 2012). The cumulative stress of caregiving, often without support, in combination with difficult family relationships places older adults at risk for abuse.

SUICIDE

Although suicide is not a diagnosis in the DSM-5, it is related to psychological disorders that are diagnosable, such as depression. Figure 11.8 shows rates of suicide in Canada by age and sex (Public Health Agency of Canada, 2019). As you can see from this figure, men have higher suicide rates at all ages; the highest suicide rate for men is between the ages of 40 and 59; however, rates among men 80 years of age and older are also very high.

Although statistically it is difficult to predict who will commit suicide at any age because the rates in the population are so low, there are several known risk factors for older adults. Older adults at greater risk of suicide suffer from higher rates of physical illness including cancer, epilepsy, cardiovascular disease, cataracts, COPD, liver disease, osteoarthritis, prostate disorders, and spinal fracture (Erlangsen et al., 2015). Higher suicide rates are also associated with poverty status in older men (Choi et al., 2019) and those with food insecurity (Cabello et al., 2019).

One key symptom to identifying an older person at risk of suicide is a history of previous suicide attempts (Murphy et al., 2012). However, the older adult contemplating suicide may not appear, even to a trained clinician, to be severely depressed. The majority of older adults who commit suicide have visited their primary care physician in the year before suicide (Raue et al., 2014). Greater sensitivity to symptoms of mood disorders in conjunction with more thorough evaluation of the additional psychological and medical risk factors through multidisciplinary training can prove helpful in identifying and managing suicide risk in older adults (Okolie et al., 2017). It is also important for health care providers to monitor prescriptions given to older adults who have a high suicide risk as well as to their families (Cobaugh et al., 2015).

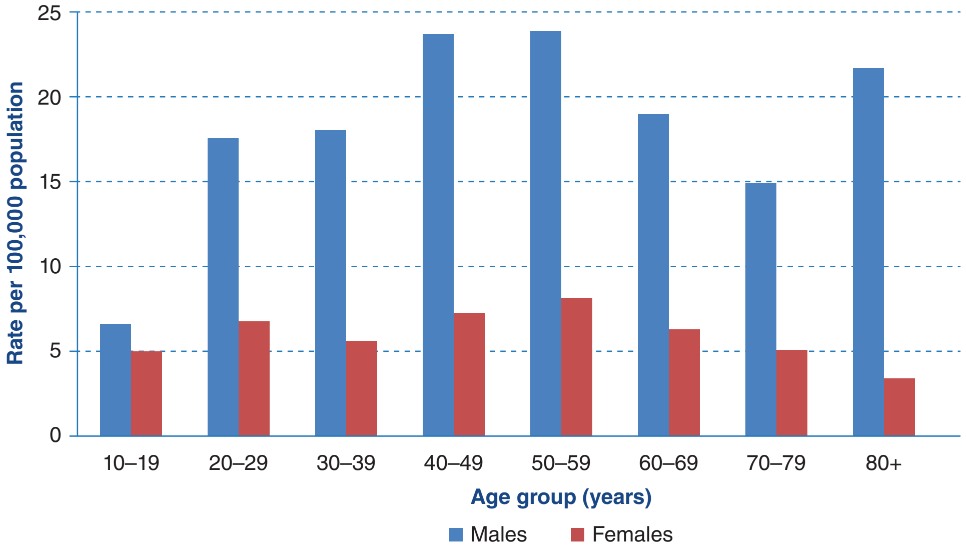
TREATMENT ISSUES IN MENTAL HEALTH CARE

With the aging of the baby boom generation, mental health researchers are turning their attention with great concern towards the need for more research and training in providing services to older adults. Clearly, more training will be needed both for practitioners currently in the field and those who will be entering the ranks of therapists and other mental health care workers.

The Canadian Coalition for Seniors' Mental Health (CCSMH), with support from the Public Health Agency of Canada, has established assessment and treatment guidelines for delirium, depression, and suicide; substance use and addiction; and mental health in long-term care. The guidelines

FIGURE 11.8

Death Rates of Suicide per 100,000 Population in 2016 (by Age and Sex)



As you can see in this graph, suicide rates are higher in men, particularly those age 40 to 59 and 80+.

Source: Public Health Agency of Canada. (2019). *Suicide in Canada: Key statistics*. Ottawa, ON: Author. Retrieved from https://www.canada.ca/content/dam/phac-aspc/documents/services/publications/healthy-living/suicide-canada-key-statistics-infographic/pub-eng.pdf are evidence-based, broad in scope, and written in a concise and practical way so that they can be used by a wide variety of people who work with older adults. There are also educational and practice tools and resources for older adults and their family members. In addition, the Mental Health Commission of Canada has published *Guidelines for Comprehensive Mental Health Services for Older Adults* (MacCourt et al., 2011).

The publication of the *APA Guidelines for Psychological Practice with Older Adults* (American Psychological Association, 2014) has led to the development of training models in the emerging field of **professional geropsychology**, the application of gerontology to the psychological treatment of older adults. Geropsychologists are expected to be aware of their attitudes and beliefs about aging, to have general knowledge about the aging process, understand psychopathology in older adults, learn to use and interpret appropriate assessment tools, and be aware of the best practices in service provision. As is true for all licensed psychologists, geropsychologists are also expected to gain continuing education in the field to stay abreast of the latest developments.

Clinicians are increasingly being trained according to these guidelines, following what is known as the **Pikes Peak Model of Geropsychology**, a set of competencies that professional geropsychologists are expected to have when working with older adults (Karel et al., 2010). Clinicians can now assess themselves in these competencies to determine which areas they require further training in (Karel et al., 2012). This is important because specialty training in clinical geropsychology is sorely lacking in Canada, particularly in comparison to the many opportunities for training in child clinical psychology. Moreover, because of the aging population and the fact that baby boomers will be more likely to seek help either for themselves or their own parents, it is important to increase training in geropsychology in Canada.

Providing psychotherapy to older adults therefore requires that the mental health professional be aware of the specific needs and concerns associated with psychological disorders in later life. Demographic factors must also be taken into account in providing psychological services to older adults, including ethnicity, gender, socioeconomic status, and the availability of family and other social supports (Whitbourne & Martins, 2020).

Assessment

A **psychological assessment** is a procedure in which a clinician provides a formal evaluation of an individual's cognitive, personality, and psychosocial functioning. An older adult may see a clinician for an assessment as part of a formal diagnostic process. The assessment may instead be used for the purpose of determining an older adult's legal competence or for planning appropriate levels of care for the older individual.

Clinicians should tailor each assessment they conduct to the physical and cognitive needs of their clients, which, in the case of older individuals, should take into account certain accommodations. Clients should be made to feel comfortable and relaxed and given sufficient time to ask questions about the procedure, which may be unfamiliar and hence stressful. There are also practical concerns that psychologists should address, such as making sure that the people they are testing have the correct eyeglasses and hearing aids, if necessary. The clinician may also have to take into account physical limitations due to arthritis and the potential for older adults to require rest periods or breaks during lengthy testing sessions.

As is true in general for communicating with older adults, clinicians conducting assessments should speak in a clear voice, make sure there is adequate lighting, and clear the room as much as possible of distractions from outside noise. Finally, it is also important to be sensitive to cultural or language differences between clinician and client, regardless of the age of the client (Edelstein et al., 2013).

A typical assessment incorporates multiple approaches, allowing the clinician to get a full picture of the individual's psychological functioning. Many clinicians begin their assessment with a **clinical interview**, a series of questions that they administer in face-to-face interactions with the client. The clinical interview has the advantage of being somewhat flexible as well as providing clinicians with insights they could only gain by directly observing how the client behaves.

The second component of assessment that is particularly important in working with older adults is a **mental status examination**, which assesses a client's current state of mind. In conducting a mental status examination, the clinician assesses such qualities of the client as appearance, attitudes, behaviour, mood and affect, speech, thought processes, content of thought, perception, cognition, insight, and judgement. The outcome of the mental status examination is a comprehensive description of how the client looks, thinks, feels, and behaves. The mental status examination also typically includes a measure of **orientation**, which reflects whether examinees know where they are (orientation to place), what time it is (orientation to time), and who they are (orientation to person).

The **Mini-Mental State Examination** (MMSE; Folstein et al., 1975) and the **Montreal Cognitive Assessment** (MoCA; Nasreddine et al., 2005) are two brief screening measures used to assess orientation, word recall, language abilities, attention and calculation, and visuospatial ability, The MoCA is a newer measure and has been shown to be more sensitive than the MMSE in differentiating mild cognitive impairment from normal cognition (Siqueira et al., 2019). These measures are only a snapshot of a patient's functioning. If a patient receives a low score, the health professional would most likely recommend a more thorough neuropsychological assessment.

Researchers and clinicians alike also make use of measures targeted towards specific symptoms in older adults. Several of these focus on depression, which, as we discussed in Chapter 5, may co-exist, mask, or be the result of a neurocognitive disorder. The **Geriatric Depression Scale (GDS)** is a screening tool that asks individuals to answer a true–false set of questions about their symptoms and is well established for use with older adult populations, although its accuracy can be improved if family members are interviewed as well (Davison et al., 2009). **The Center for Epidemiological Studies Depression Scale (CES-D)** is a 20-item questionnaire that screens for depressive symptoms (Radloff, 1977), which is also widely used in research settings.

A key area of differential diagnosis is distinguishing between a neurocognitive and other psychological disorders, particularly depression. As we saw in Chapter 5, depression can cause pseudodementia and can lead the clinician to inaccurately diagnose a neurocognitive disorder when the client's symptoms represent a disturbance of mood. However, there are important differences in the symptom pattern of individuals with these disorders. In depression, the symptoms of dysphoria are more severe, and the individual is likely to exaggerate the extent to which he or she is experiencing memory loss. People who have neurocognitive disorders tend, in contrast, to be overconfident about their cognitive abilities. They may show very wide variations in performance from one test to another. Over time, they show a progressive loss of cognitive functioning.

Differences between depression and dementia are important for clinicians to note in their assessment of older adults. As we pointed out in Chapter 5, if the depression is caught in time there is a good chance of successful treatment, whereas if the individual's symptoms are due to a neurocognitive disorder, the clinician will take another approach to intervention. Conversely, if their depression is not treated, older adults with pseudodementia may go on to develop an irreversible neurocognitive disorder (Connors et al., 2018).

In addition to these psychological assessment tools, clinicians evaluating older adults also measure their ability to perform activities of daily living (ADLs) and instrumental ADLs (IADLs). These provide important information that can be used in treatment planning, especially if it appears that the client might be best served in an institutional setting. Moreover, clinicians also track changes in the ADLs and IADLs over time to determine whether changes are needed in the client's placement status, perhaps corresponding to changes in cognitive functioning.

Clinicians typically complete their assessment of a client before they go on to adopt a treatment strategy, although they continue to assess their clients throughout the course of therapy. Ongoing evaluations allow clinicians to use information gathered from treatment to help refine their initial diagnoses and monitor the progress of their clients as they proceed through treatment.

Treatment

Following the assessment phase, clinicians embark on a program of treatment intended to provide the client with relief from his or her symptoms. The best mental health treatment follows a biopsychosocial model in which clinicians take into account the complex interactions among the client's physical symptoms and health, cognitive abilities, emotional strengths, personality, sense of identity, and social support network.

As is true for medical care, clinicians in the field of mental health also strive to work with professionals in other disciplines, allowing the older client to benefit from an integrated approach that brings together nursing, physical therapy, occupational therapy, psychotherapy, medical care, and input from family. Models other than the traditional provision of psychotherapy are clearly becoming seen as viable alternatives for work with older adults. Care managers can be used to coordinate services to individual clients, offering services through primary care physicians to ensure that the clients maintain their involvement in treatment.

Interventions with older adults are increasingly following the standard of **evidence-based practice**, meaning that clinicians should integrate the best available research evidence and clinical expertise in the context of the cultural background, preferences, and characteristics of their clients (American Psychological Association Presidential Task Force on Evidence-Based Practice, 2006). Consequently, mental health professionals need to be able to adapt their treatment modality that provides the best fit to the patient's diagnosis. Aiding in this effort are the continuing publications of clinical practice guidelines by organizations such as the American Psychological Association and the National Institutes of Clinical Excellence that psychologists and other mental health professionals are able to use to ensure they are providing the best treatment to their clients.

Medical Interventions. Treatment offered from the perspective of the **medical model** focuses primarily on the physiological causes of a psychological disorder. In the medical model, the primary line of defence against psychological disorders involves using **psychotherapeutic medications**, which attempt to reduce an individual's psychological symptoms. These medications cannot cure the disorder, but they can alleviate the client's distress from its most prominent symptoms.

The major categories of medications used to treat psychological disorders in older adults are antidepressants, anxiolytics (used to treat anxiety), and antipsychotics (used for schizophrenia and related disorders). Individuals with bipolar disorder receive mood stabilizers, primarily lithium carbonate.

Additionally, for older adults with severe depression, another medical intervention involves **electroconvulsive therapy (ECT)**, in which an electric current is applied through electrodes attached across the head. Although it can be effective when no other treatment has proven to alleviate an older adult's depression, ECT carries the risk of short-term memory loss, which makes it a less than desirable treatment for older adults.

The prescribing of psychotherapeutic drugs may involve a process in which alternate medications are prescribed until one, or a combination, is found that helps the client's symptoms subside. For older adults, the process may be a challenge because many psychotherapeutic medications interact with other medications that these clients take for their chronic diseases. Moreover, because older adults typically see multiple health professionals, they are at great risk for these unintended consequences. A physician might prescribe a sleeping medication to an older adult patient who is already taking an antianxiety or cardiac medication, potentially causing the older adult to become suicidal due to the interaction of the medications. As was reviewed earlier, benzodiazepines are particularly harmful to older adults. Consequently, clinicians who work with older adults must take detailed and careful histories. The need to avoid dangerous interactions among medications is another reason that integrative health care is so important for older adults. In addition to taking precautions against drug interactions, clinicians must be familiar with medications' side effects for older adults, which may differ from those seen with younger adults. Unless the clinician prescribes them in lower doses, older adults are at risk of accumulating toxic levels in the blood because aging increases the time that medications take to clear the excretory system of the kidneys.

Psychotherapy. Research on evidence-based treatments for older adults with psychological disorders increasingly supports the use of psychotherapy alone. Medications may also be prescribed by a treating professional. However, the risks of over-medication or harmful drug–drug interactions (Kok & Reyolds, 2017), along with empirical support for psychotherapy, suggest that psychotherapy should be the first line of intervention with older adults (Raue et al., 2017). Unfortunately, in spite of the fact that the evidence base for psychotherapy with older adults is strong, they are an underserved population and are less likely to be referred for psychological treatment compared to other age groups (Karel et al., 2012).

In **cognitive behavioural therapy (CBT)**, the clinician encourages clients to develop more adaptive behaviours and ways of thinking about their experiences. There is increasing support for CBT in treating older adults (Conti et al., 2017) (see Figure 11.9). CBT's advantages include being relatively short term (as few as seven sessions) and deliverable via audio therapy (delivered with audio CDs) and computer-based teletherapy (Shah et al., 2018). These approaches are advantageous to patients who live in rural areas or are unable to be transported to a therapist's office.

For older adults with depression, CBT involves helping clients understand the relationship between their mood and their involvement in pleasant and unpleasant events. The cognitive piece, further, involves therapists teaching their clients to be alert to and then try to change their negative thoughts about themselves. CBT has also shown to be an effective intervention for suicidal older adults (Bhar & Brown, 2012). For older adults with insomnia and depression, CBT can aid in promoting better sleep habits (Tanaka et al., 2019b).

The relaxation component of CBT, in which patients learn to achieve physical and mental relief from stress (Klainin-Yobas et al., 2015), can also benefit older adults with anxiety as well as those with depressive disorders. For older veterans with PTSD, relaxation therapy also can be effective, at least for the short term, when combined with exposure therapy, a behavioural method in which patients mentally re-enact the trauma (Thorp et al., 2019).

Although not a psychological disorder, fear of falling is a significant risk factor that can impact the health of older adults. CBT can be targeted to fear of falling as one component of intervention along with exercise training (Chua et al., 2019).

Exercise also appears to have potential in treating depression in older adults. A meta-analysis of studies using randomly assigned experimental and control groups showed beneficial effects of even moderate intensity (aerobic) exercise even for individuals assigned to group exercise conditions (Schuch et al., 2016). There is also evidence from the "Warrior Wellness Study" that older veterans with PTSD can benefit from exercise training, both in terms of their PTSD symptoms and in treating insomnia, depression, and health-related quality of life (Hall et al., 2019).

Another approach extends CBT to incorporate principles of mindfulness, in which patients learn to attend to the details of their experiences as they become guided in "living in the

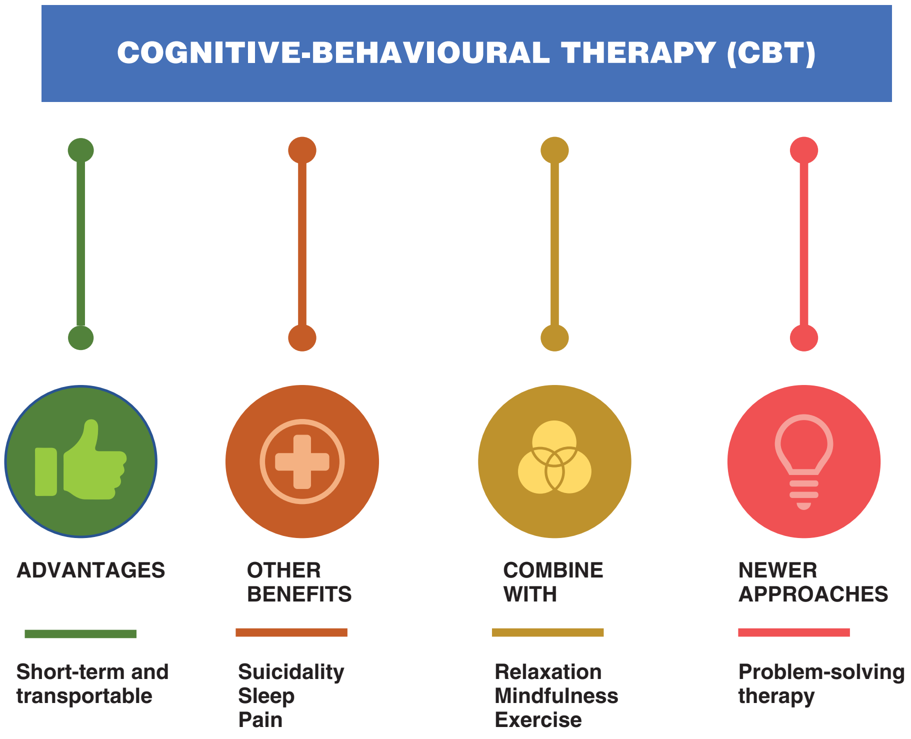


FIGURE 11.9

Cognitive Behavioural Therapy

Summary of cognitive behavioural therapy with older adults.

moment." Mindfulness therapy is effective in improving positive affect, reducing anxiety, and also having the added benefits of improving cognition as well as reducing insomnia and lower back pain (Hazlett-Stevens et al., 2019).

Related to CBT is a relatively newer approach of **problem-solving therapy (PST)**, in which patients are taught systematic ways of identifying and solving their actual life problems. The theory behind PST is that as individuals reduce their sources of stress, their mood and well-being will improve. Promising results from controlled studies with randomized designs support PST's utility in reducing disability due to depressive symptoms in older adults (Kirkham et al., 2016).

Psychosocial issues involving relationships with family may also confront an older adult and should be taken into account by clinicians providing psychotherapy (Knight & Kellough, 2013). These issues include death of family and friends, changes in relationships with children and spouses, and the need to provide care to a spouse or parent. Along these lines, older adults with higher levels of social support seem to benefit more from CBT in terms of improved quality of life following treatment (Shrestha et al., 2015). By addressing issues involving family and other social relationships in therapy, it may be possible to augment the impact of treatment on the older adult's symptoms.

Although therapy can have many beneficial effects, equally important as treatment is prevention. Targeting specific older adults at risk, such as those who have become bereaved and have experienced illness or disability, can help not only to reduce the need for treatment but also to maximize the functioning of older adults who might otherwise be at risk of developing psychological disorders.

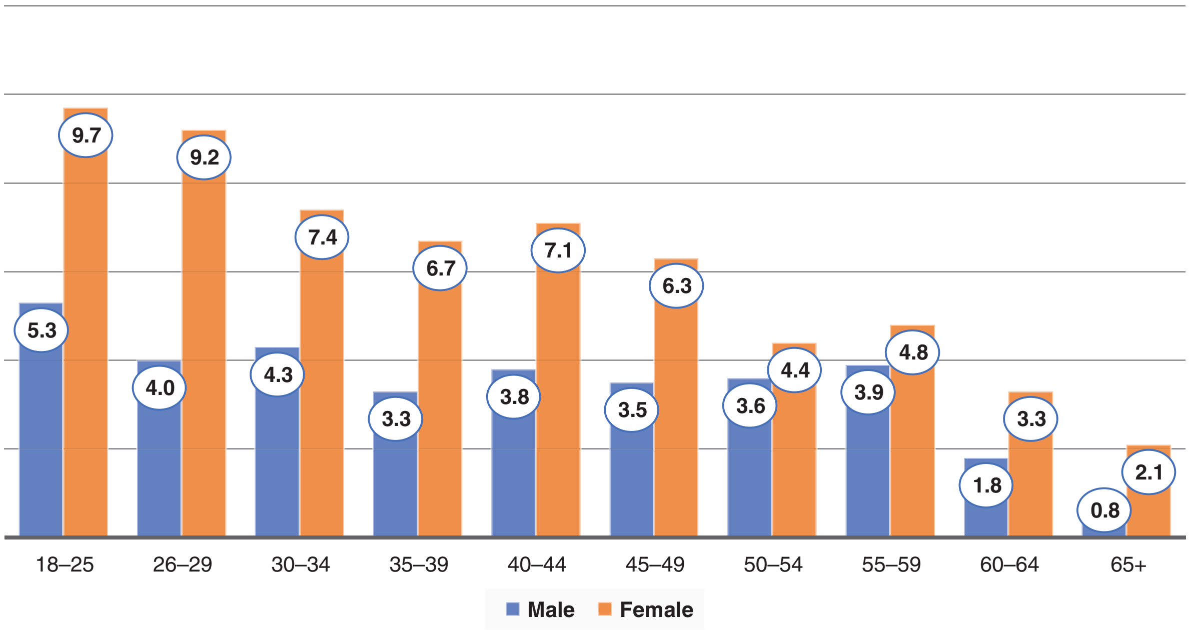
SERIOUS MENTAL ILLNESS

Though we have focused in this chapter on psychological disorders in older adults, it is important to remember that despite the presence of chronic physical health conditions, the majority of older adults do not experience significant distress. This fact is borne out by the Substance Abuse and Mental Health Services Administration (SAMHSA), which tracks the incidence of serious mental illness. Survey after survey in this series consistently reports lower rates of serious mental illness within the past year for adults 65 and older (see Figure 11.10). As you can see, women have higher rates of serious mental illness than do men at all ages, particularly in emerging adulthood and less so at later ages. With the exception of a slight rise among women 55 to 59 years, all other indications are that older adults are in better mental health than are younger aged adults (SAMHSA, 2018).

Clearly, although older adults are at higher risk in an objective sense for experiencing psychological disorders, a combination of selective survival, enhanced use of coping mechanisms, and an ability to maintain an optimistic attitude towards adversity seem to offer significant protective factors against psychological problems in later adulthood. Increasingly, new methods of treatment are becoming available to provide

FIGURE 11.10

Rates of Serious Mental Illness in Adults by Age, the United States, 2017



As can be seen here, the rates of serious mental illness are consistently lower across adulthood.

Source: Substance Abuse and Mental Health Services Administration.(2018). *National Survey from the 2017 National Survey on Drug Use and Health: Detailed Tables.* National Survey of Drug Use and Health. Rockville, MD: Center for Behavioral Health Statistics and Quality.

services to those older adults who need assistance in these adaptive processes.

In summary, when we think of the aging process, you are likely to anticipate a number of negative changes that would have adverse mental health effects. By contrast, the facts reveal that older adults are highly resilient to the physical, psychological, and social changes involved in the aging process. It is nevertheless true that there will be an increasing need for mental health workers in the coming decades trained in diagnosis, assessment, and treatment, and there will also be an increased need for research on effective treatment methods for aging individuals in need of intervention. In Canada, there is a clear need to meet the needs of older adults in rural and remote communities and ethnically diverse older adults, as these groups are typically underserved by the mental health system.

SUMMARY

1. Psychological disorders are those behaviours that significantly alter the individual's adaptation. The DSM-5 contains descriptions of the disorders that can affect children and adults and is used by clinicians to assign diagnoses based on specific criteria. Ageism may affect the quality of services provided to older adults for the treatment of psychological disorders.
2. Although the prevalence of a diagnosable mood disorder is lower in older adults than in younger adults, many older adults report symptoms of depressive disorders. Health care professionals may not be attuned to diagnosing depressive symptoms in older adults. Medical conditions increase the risk for depression, including hip fracture, stroke, hypertension, and diabetes. A diagnosis of bipolar disorder occurs in individuals who have experienced one or more manic episodes during which they feel elated, grandiose, expansive, and highly energetic. Rates of bipolar disorder are lower among older adults compared with younger adults. Individuals diagnosed with anxiety disorders experience a sense of dread about what might happen in the future and will avoid anxiety-provoking situations. Anxiety disorders are more common in younger adults than older adults, as well as among women. Types of anxiety disorders include generalized anxiety disorder, panic disorder, agoraphobia, specific phobias, and social anxiety disorder. People who experience obsessive-compulsive disorder suffer from unrelenting, irrational, and distracting obsessions and compulsions. Although the lifetime prevalence among older adults is extremely low, rates of detection may also result in lack of treatment.
3. Exposure to traumas can lead individuals to experience a variety of symptoms that may last for a prolonged period of time and can include acute stress and PTSD. Combat exposure appears to put older adults who served as veterans in the theater of war at risk for PTSD and the related condition of LOSS. Individuals diagnosed with schizophrenia experience distorted perception of reality and impairment in thinking, behaviour, affect, and motivation. Substance-related disorders are more likely to occur in younger adults. However, alcohol abuse and dependence are becoming an area of concern for the over-65 population, as are disorders related to the use of prescription medications. Personality disorders are characterized by a long-standing pattern of inner experience and behaviour that has maladaptive qualities. Older adults are less likely to exhibit antisocial and borderline personality disorder symptoms, although selective survival may affect the rates of antisocial behaviours by older adults.
4. Two additional topics of concern in the area of mental health and aging are elder abuse and suicide. Elder abuse includes physical, sexual, emotional, financial, and neglect. Risk factors for suicide among older adults include the presence of a psychiatric illness, physical illness, and limitations in functioning, chronic pain, and cognitive functioning deficits.
5. The field of clinical geropsychology involves the provision of psychological services to older adults. Treatment begins with thorough assessment. A number of tools are available that can be applied specifically to persons in later life. These tools range from clinical interviews to structured self-report inventories. Assessment of people within this age group requires that the clinician adapt the test materials and the testing situation to the specific needs and cognitive or sensory limitations of the older adult. CBT is regarded as having considerable value in the treatment of older adults with depression, anxiety, and PTSD. Enhancements to CBT can have additional benefits to physical health.
6. Despite the many threats to positive mental health, the majority of older adults do not report elevated levels of serious mental illness suggesting that there is considerable resilience among individuals in later adulthood.

12

Long-Term Care

Compassionate and respectful care of older adults living in long-term care facilities is incredibly important for families, friends, and, of course, the residents who live there. Here are the top 10 ways that facilities truly stand out!

AGEFEED

#top10facts

1. Keeping family members up-to-date on day-to-day activities through blogs, social media, or electronic communication.
2. Having sing-alongs with local daycares and schools.
3. Encouraging residents to eat together to foster a sense of community.
4. Getting residents to engage in physical activity such as through dance or fitness classes.
5. Having communal kitchens so residents can cook together and with loved ones.
6. Offering lectures on topics such as literature, art, and music.
7. Engaging residents to plant and tend to vegetable or herb gardens that provide fresh foods.
8. Celebrating holidays and birthdays as a community.
9. Having regular social activities, such as game, movie, and trivia nights.
10. Allowing residents to make their living quarters feel like home, such as by hanging treasured artwork or bringing in their favourite furniture.

Have you ever lived in an institution? Your first response may be no, unless you have been hospitalized for a physical or psychological disorder. However, think about the question in a slightly different way and you might realize that it's more accurate to say "yes." If you live in on-campus housing, then it's fair to regard the situation as involving institutional living. Dormitory residents live under one roof, are not related to each other, and are there because they share a similar position in life. In a dormitory, as in a hospital setting, residents must deal with problems that come with communal living, such as being unable to control many aspects of the environment, needing to answer to people in charge, eating food prepared for a large number of people, and being assigned to live with a stranger.

In this chapter, we define an **institutional facility** as a group residential setting that provides individuals with medical or psychological care. Hospitals are short-term (or acute care) institutional facilities to which people are admitted with the understanding that they will be discharged when they no longer need round-the-clock treatment. At the other end of the spectrum are long-term institutional facilities into which an individual moves permanently after losing the ability to live independently.

Closely related to the issue of institutional care is that of the funding for health care, another topic we cover in this chapter. Individuals hospitalized for physical and psychological problems in later life are increasingly confronting the rising cost of health care as a barrier to effective resolution of their difficulties. In addition to the problems that result from failure to receive proper treatment, this situation creates considerable stress and anguish for the older individual and that individual's loved ones.

Although you may not spend much time thinking about the health care coverage available to you in your later years, you are surely aware of the intense debate about the future of health care in the coming decades. Much of this discussion has centred on "apocalyptic demography," the oversimplified belief that a demographic trend like population aging has dire consequences (Chappell, 2011, p. 3). In the Canadian context, this discourse has centred on the extent to which we can sustain existing models of health care for future cohorts and the alternative models that are available, viable, and affordable. From offering public options for health insurance to making prescription medications more affordable for older adults, health care is one of the most crucial issues facing Canada as well as many other countries. Simply put, how can Canadians design a health care system that integrates formal care from public and/or private sources and informal care from family caregivers in a cost-effective and sustainable manner? How can we target those older adults that need the most support? From a biopsychosocial perspective, these large-scale social factors can have significant impacts on the health and well-being of the older population.

AN OVERVIEW OF LONG-TERM CARE

There is no common definition of long-term care in Canada. The National Institute on Ageing (NIA), a public policy and research centre based at Ryerson University in Toronto, defines long-term care as: "A range of preventive and responsive care and supports, primarily for older adults that may include assistance with Activities of Daily Living (ADLs) and Instrumental Activities of Daily Living (IADLs) provided by either not-for-profit and for-profit providers, or unpaid caregivers in settings that are not location specific and thus include designated buildings, or in home and community-based settings" (NIA, 2019a, p. 7). In some provinces (e.g., Alberta), long-term care is referred to as continuing care. Other provinces have more narrow definitions of long-term care. For example, in Ontario, long-term care refers only to nursing homes (NIA, 2019a).

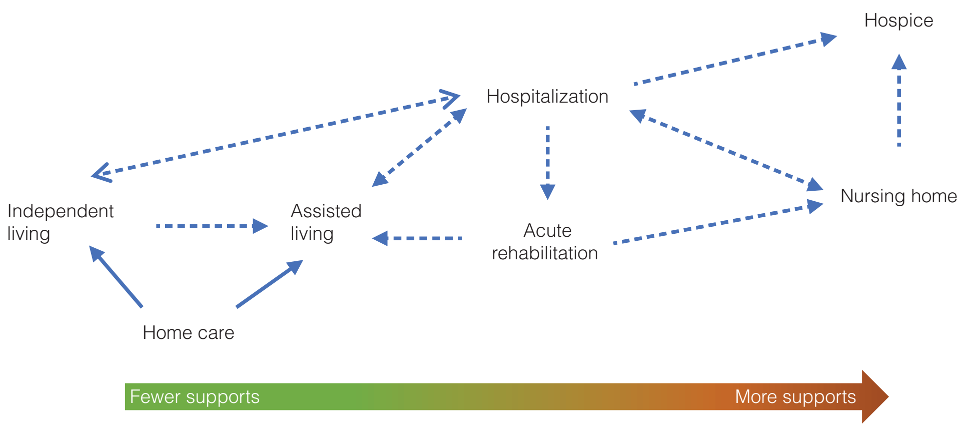
Note that the definition indicates that long-term care is "primarily" for older adults. However, people of all ages may need long-term care if, for example, they have an unexpected debilitating illness or a traumatic injury. For example, according to 2018–2019 data from the Canadian Institute for Health Information (2019), about 7 percent, or almost 13,000 residents of long-term care homes, are younger than 65 years of age. The problems of younger adults range from traumatic injuries (e.g., spinal cord injury, concussion) to progressive disorders (e.g., multiple sclerosis). Unfortunately, we know very little about their specific needs, and long-term care policies and practices often assume that all residents are old.

Figure 12.1 illustrates the continuum of long-term care facilities for older adults and shows the patterns that may characterize the living arrangements as individuals move along the continuum of care from fewer to more supports, moving back to lesser care if they are able to do so. The process begins with older individuals living on their own, or in a group setting such as an assisted living facility. In either care, they may receive home care. When there is an acute health event (such as a broken hip or stroke), they will then require hospitalization. From there, they may be placed in an acute rehabilitation facility and either return home or to the assisted living facility. However, if they require more care than is required in these settings, they will be transferred to a nursing home. The process may continue through cycles if the individual experiences a health event, potentially culminating in death in a hospice (which we discuss in Chapter 13). The process is further complicated if an older adult has a major neurocognitive impairment, a significant risk factor for relocation to a higher level of care such as a nursing home. As you can see, the progress of individuals through institutional living can become quite complex.

As you know from Chapter 1, the Canadian population is aging and the number of people over the age of 85 has grown dramatically. It is estimated that by 2051, almost 25 percent of older adults will be age 85 or older. This has significant implications as, in 2016, nearly one-third of people aged 85 and older lived in collective dwellings such as nursing homes and seniors' residences (Statistics Canada, 2017a). Figure 12.2 indicates the percent of the population 85 and older that lived in various collective dwellings, by age group, in 2016 (Statistics Canada, 2017a). Canadian provinces and territories are currently struggling to keep up with the demand for high-quality long-term care within already strained health care budgets, as people live longer with more complex physical and mental health needs

FIGURE 12.1

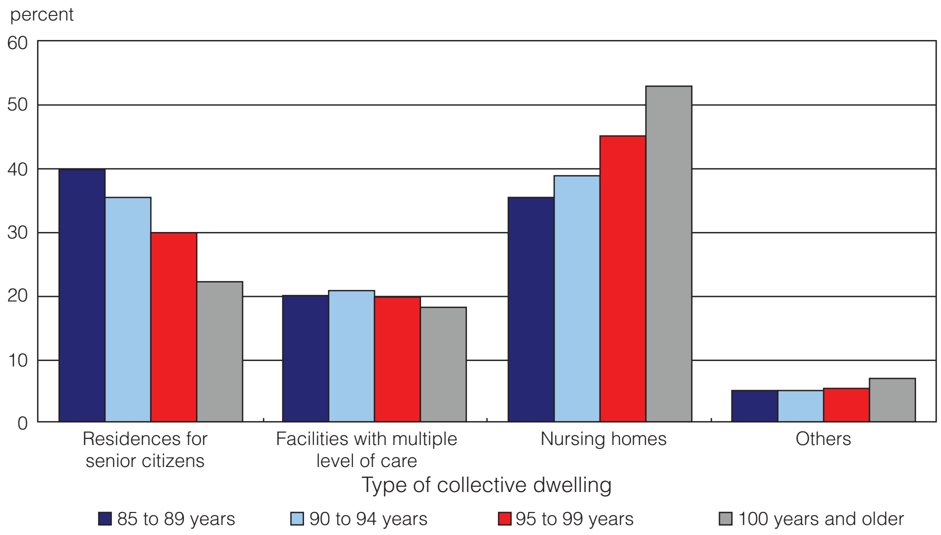
Continuum of Long-Term Care



This continuum of care shows the trajectory that care for older adults takes as individuals progress from independent living to nursing homes, and ultimately to a hospice for end-of-life care.

FIGURE 12.2

Proportion of the Population Aged 85 and Older Living in Collective Dwellings, by Type of Collective Dwelling and Age Group, in 2016



As shown in this graph, the proportion of people aged 85 and older living in nursing homes increased from 35.3 percent for people aged 85 to 89 to 52.8 percent for centenarians, while the proportion living in seniors' residences decreased from 39.7 percent to 22.1 percent for the same age groups.

Source: Statistics Canada. (2017a). *A portrait of the population aged 85 and older in 2016 in Canada.* (Catalogue no. 98-200-X2016004). Ottawa, ON: Author. Retrieved from https://www12.statcan.gc.ca/census-recensement/2016/as-sa/98-200-x/2016004/98-200-x2016004-eng.cfm

(NIA, 2019a). This will become even more of a challenge as the population ages.

Grignon and Spencer (2018) indicate that long-term care accounts for about 12 to 16 percent of total health care spending in Canada, with home care accounting for 10 to 30 percent of long-term care expenditures. Projected costs of public care in nursing homes and private homes will triple between 2019 and 2050, from $22 billion to $71 billion (MacDonald et al., 2019). As these authors rightly point out, this is only part of the picture. Family caregivers are the major source of support for older adults, and, as baby boomers age and fertility rates decline, there will be much more pressure on family members (usually women) to provide unpaid care. MacDonald et al. (2019) indicate that by 2050, approximately 120 percent more older adults will be using home care and there will be 30 percent fewer close family members potentially available to provide care. They will be expected to increase their caregiving activities by 40 percent. These authors state, " Baby boomers are strongly advised to take a long, hard look at their own personal circumstances and plan ahead, to the extent that they have the health and financial means to better protect their future and possibly more vulnerable selves. At the public policy level, effective reforms require long lead times, so developing long-term care options should be an immediate and high priority" (MacDonald et al., 2019, p. 9). National surveys reported that 63 percent of Canadians indicated that they were not in a good position (financially or otherwise) to care for older relatives if they needed long-term care (Ipsos Public Affairs, 2015) and 88 percent were concerned about the costs of caring for an aging population (Ipsos Public Affairs, 2019).

Many Canadians do not realize that facility-based long-term care is not covered by the *Canada Health Act,* and it is not a fully insured health service in any province or territory. Each jurisdiction is responsible for providing long-term care, and there is considerable variability across provinces in the terms that are used to describe different levels of care. The exception to the provincial responsibility for long-term care is Veterans Affairs Canada, which provides care for qualifying veterans and their spouses through agreements with the provinces and territories.

Each province and territory has its own system for funding long-term care with a mix of privatized and publicly funded services. Approximately three-quarters of the funding is paid by provincial and municipal resources, while the remainder is paid for by individuals (Canadian Health Coalition, 2018). Most people do not understand that they are expected to pay for many long-term care services. For example, nursing home residents are required to pay to live there (these fees are often referred to as accommodation co-pays), and the amount they have to pay varies significantly depending on what province or territory they live in. It also depends on their income (i.e., your care may be subsidized if your income is low) and the type of room they prefer (e.g., semi-private vs. private room). Depending on where you live, these co-payments can range from $1,000 to $3,400 per month (Canadian Health Coalition, 2018). Figure 12.3 indicates various accommodation costs in selected provinces, according to a 2018 policy brief provided by the Canadian Health Coalition (2018). Moreover, there may be additional costs, such as for prescription drugs (some provinces pay only part of these costs), and for specialized care needs and services—for example, hiring outside workers to provide more personal care beyond what is provided by the facility. These accommodation and additional costs can be a significant burden to older adults with fewer financial resources. This is particularly true if one spouse enters long-term care and the other remains in their home, as not every jurisdiction takes this into account when assessing the co-payment fees. These costs are increasing and will continue to do so. Wealthy older adults who can pay the full cost of their care have a range of high-end, private residential options to choose from. These facilities typically charge a base amount and add additional fees depending on the level of care provided. For example, extra fees may be assessed for administering more medications or managing incontinence. With these extra fees, residential costs in the most expensive facilities can exceed $10,000 per month. However, as we will see later in this chapter, many factors contribute to high-quality care, and paying more is no guarantee that you will receive better care.

Grignon and Bernier (2012) reviewed the various options for financing long-term care in the future, including private savings, private insurance, and universal public insurance. They concluded that saving for long-term care is unrealistic. According to their estimates, on average, individuals would need to save $7,500 per year over a 40-year period, for a total of $300,000. They note that no country in the world has relied exclusively on private savings to fund long-term care, and they

FIGURE 12.3

Accommodation Co-pay in Selected Provinces

As shown in this table, long-term care costs and funding policies vary significantly between provinces.

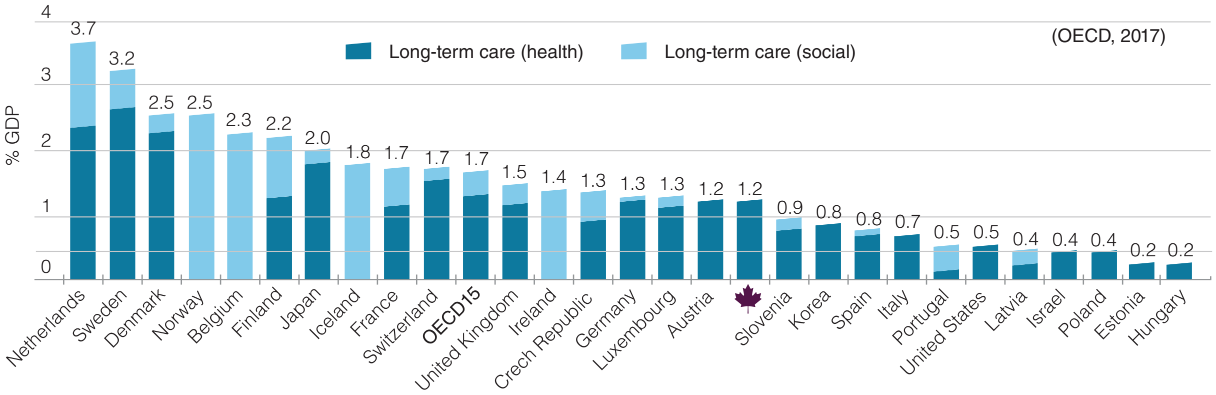
Province	**Accommodation Co-pay (per month)**	**Variation Based on**	**Subsidy/Rate Reduction**
Ontario	$1,848.73 for basic accommodation $2,640.78 for a private room	Accommodation type	Low-income residents can apply for a subsidy through the Long-Term Care Home Rate Reduction Program for the cost of basic accommodation
Alberta	Between $1,673 and $2,036	Accommodation type	Seniors on social assistance may have their charges partially or fully covered
British Columbia	Between $1,130.60 and $3,278.80	Income	Additional subsidy for eligible residents
New Brunswick	Maximum rate of $3,437	Accommodation type	Residents unable to afford the co-pay can apply for a subsidy based on monthly income
Manitoba	$1,092 to $2,550	Income	

*Note: This includes public and private facilities, except in British Columbia, where only public facilities receive government funding. In long-term care facilities in British Columbia without public subsidies (which are usually called "licensed beds") residents bear the full cost of care and accommodation, at an average of $6,000 a month.

Source: Canadian Health Coalition. (2018). *Ensuring quality care for all seniors*. Ottawa, ON: Author. Retrieved from http://www.healthcoalition.ca/wp-content/uploads/2018/11/Seniors-care-policy-paper-.pdf

FIGURE 12.4

Long-Term Care Expenditure (Health and Social Components) by Government and Compulsory Insurance Schemes, as a Share of GDP, 2015 (or nearest year) Across OECD Nations



Note: The OECD average only includes the 15 countries that report health and social LTC.

Canada spends significantly less than other developed countries on publicly-funded long-term care.

Source: Organization for Economic Co-Operation and Development. (2017). *Health at a glance 2017: OECD indicators*. Paris, Fr: Author. Retrieved from https://www.oecd-ilibrary.org/docserver/health_glance-2017-en.pdf?expires=1595879070&id=id&accname=guest&checksum=A68F7A489280420C196D3B78AE3FED4C.

view this as an inefficient system for Canada. Private long-term care insurance has not gained popularity in Canada, with less than 1 percent of Canadians holding this type of insurance. This may be because many Canadians mistakenly believe that long-term care is fully paid for by public programs, because they deny a risk that could affect them in 20 to 30 years, or because they cannot afford long-term care insurance. Grignon and Bernier (2012) suggest that the best solution is a universal public insurance plan with a single payer that provides full coverage based on a standardized evaluation of care needs. This would alleviate the uncertainty around accessing care in old age and would be a more equitable and efficient way of structuring long-term care in Canada. As you can see from Figure 12.4, Canada spends significantly less on publicly funded long-term care than many other developed countries (Organization for Economic Co-operation and Development, 2017).

Recognizing that the names for different levels of care vary across Canada, for the purposes of this chapter we will divide the discussion into community-based services such as home care and adult day programs, supportive living (or assisted living), and nursing homes.

Martin Barraud/Caiaimage/Getty Images, Inc.

Long-term care insurance is not a popular option among Canadians looking to finance the cost of their care as they grow older.

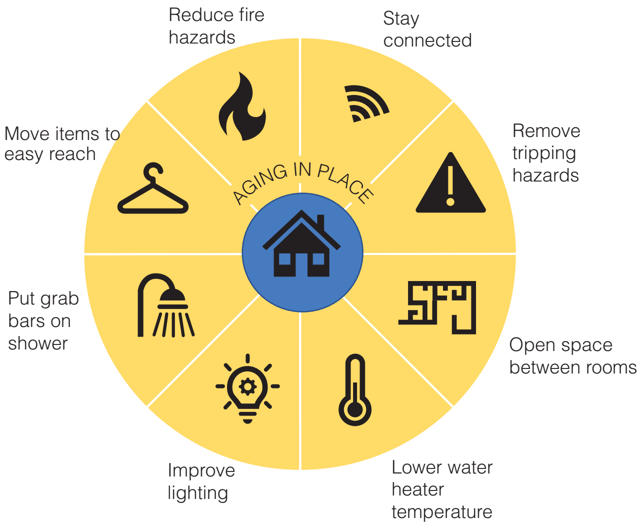
Community-Based Services

Older adults who choose not to live in a residential facility but still need some type of care can take advantage of a number of support services that allow them to live independently in their own homes. The residential environment of the older adult can be conceptualized along four dimensions, including the aesthetics and safety of the local area, convenience of access to shops and services, positive regard and mutual help among neighbours, and the attractiveness and ease of accommodation within the home. Each of these represents qualities of the physical environment, rather than the perceived environment. Research evaluating their contribution to the older adult's adaptation to the community suggests that the reality of the environment plays a crucial role in influencing well-being and satisfaction (Rioux & Werner, 2011).

The concept of **aging in place** refers to the principle that with appropriate services, older adults can remain in their own homes, or at least in their own communities (Gillsjö et al., 2011). Taking advantage of the same multidisciplinary focus so important for institutional care, older adults can benefit from interventions that allow them to maintain their autonomy and previous patterns of living (Szanton et al., 2019). The aging in place movement should also be bolstered by advances in digital technology that can supplement the services provided to older adults by connecting them to online sources of support. Other assistive technology advances can also benefit older adults living at home, including adaptive toilets that allow height and tilt adjustments, as well as emergency notification

FIGURE 12.5

Key Elements of the Aging in Place Model



According to the model of aging in place, older adults should be able to remain in their own homes as long as possible with the supports shown here.

(Mayer et al., 2019). Figure 12.5 shows suggestions for modifications to the home that can help facilitate aging in place. The lowering of water temperature is intended to reduce burn risks. Maintaining a smart home will also permit older individuals to be able to not only call in the case of emergencies but also to stay on top of weather or other community alerts.

Home Care Services

Bringing services into the home is the focus of **home care**, which provides assistance to older adults within their own private residences. These include "Meals on Wheels," the provision of a hot meal once a day; so-called "friendly visiting," in which a volunteer comes to the home for a social visit; and assistance with shopping. Other home-based services provide assistance with light housekeeping, such as laundry, cooking, and cleaning.

Home health care services may also include the types of restorative services that nursing homes provide, such as physical therapy, speech therapy, occupational therapy, rehabilitation, and interventions targeted at particular areas of functional decline. The home health care worker comes right into the individual's home, bringing along equipment as necessary. The advantage to home health care over institutional care is that the older adult can remain at home, staving off institutionalization or hospital/emergency room care. Moreover, home health care workers can teach older adults in their care how to maximize their mobility through such measures as fall prevention, muscle strength training, and home safety (Gitlin et al., 2009). However, some home health care workers cannot provide skilled nursing to their clients nor can they perform heavy maintenance or assistance in areas outside of health services, such as paying bills.

Home care is a vital part of the health care system for a variety of reasons. First, as shown by survey after survey, people prefer to receive care at home. Second, home care is cost-effective (Hollander & Chappell, 2007). Governments are keenly aware of rising health care costs, and home care is viewed as one way to reduce health care budgets. In order to be cost-effective, home care must be integrated with other components of the health care system, with effective linkages and coordination by case managers who can guide patients through the health care system. For example, the Home at Last program in Ontario helps older adults and adults with special needs make the transition from hospital to home by facilitating the discharge process, providing supportive services, assisting in future care planning, and minimizing the risk of readmission. Home care, like long-term care in general, is an underfunded and undervalued sector of the health care system.

Gilmour (2018) estimated that, in 2015/2016, over 430,000 adult Canadians had unmet home care needs. Those that are most likely to have unmet needs are: low-income older adults, caregivers, older women, immigrants, the oldest Canadians (85 years and older), older adults with physical limitations, and older adults who live alone (Sinha et al., 2016). The lack of home care support has resulted in about 40,000 older Canadians waiting for beds in nursing homes, often residing in expensive hospital settings (NIA, 2019a). These individuals are known as **Alternate Level of Care (ALC) patients**; they reside in hospitals but no longer need such a high level of care but are simply waiting for a long-term care bed. Often they are medically stable but have symptoms of dementia and are waiting for nursing homes that can provide the right level of behavioural support. Many do not have a strong support system in place to address their complex needs. This is an expensive and resource-intensive option for the health care system and a poor living environment for older adults, who may experience further decline in overall health and well-being as a result of their extended stay in a hospital setting. Picard (2019) reported that, in Nova Scotia, about one-third of hospital beds are occupied by ALC patients, at a very significant cost to the health care system.

Thus, lack of funding for home and community-based care and greater reliance on hospital-based care is an inefficient use of health care dollars. Relative to other OECD countries, Canada ranks 24th out of 27 countries in the proportion of long-terms care dollars spent on home and community-based care at 13 percent. In contrast, Denmark spends 64 percent of its long-term care budget on home and community-based care (Organization for Economic Co-Operation and Development, 2017). More funding for home and community care was a priority in the 2017 federal budget (Department of Finance Canada, 2017).

Like institutional care, home care is not an insured service under the *Canada Health Act*, and provinces and territories fund a limited amount of home care options, provided by both private and public agencies. There is tremendous variability in access to home care, both across and within provinces and territories, and in the implementation of co-payments and user fees. For example, some regions use a means test to determine access to home care services, while others have established a maximum level of care that all persons receive. However,

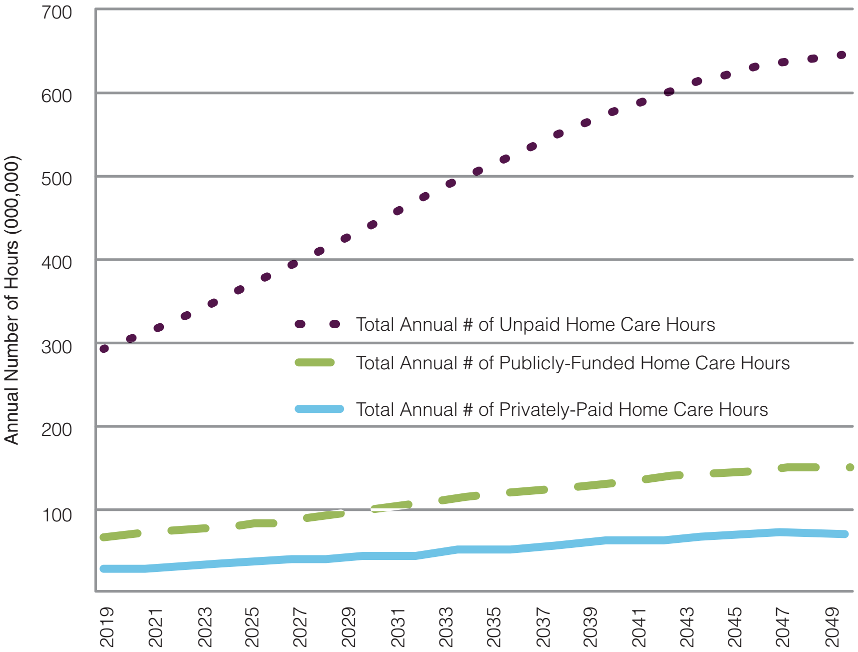


FIGURE 12.6

Total Annual Number of Publicly Funded, Privately Paid, and Unpaid Home Care Hours

As shown in this figure, the amount of care that family members will be required to provide to older relatives in the future will increase significantly.

Source: MacDonald, B. J., Wolfson, M., & Hirdes, J. (2019). *The future co$t of long-term care in Canada.* Toronto, ON: National Institute on Ageing, Ryerson University. Retrieved from https://static1.squarespace.com/static/5c2fa7b03917eed9b5a436d8/t/5dbadf6ce6598c340ee6978f/1572527988847/The+Future+Cost+of+Long-Term+Care+in+Canada.pdf

once that maximum has been exceeded, users are required to pay for services (although some may receive some tax relief in return). In addition, regions vary in the mix of public and private providers and the relationships between the two. To further complicate matters, most provincial governments delegate the responsibility for funding and delivering home care to their regional health authorities. The advantage of this model is that regional health authorities are better able to integrate home care into the spectrum of long-term care services. The disadvantage is that home care is vulnerable to cyclical funding (often competing with institutional care) and political changes. This has led to considerable inequity both within and across provinces and territories in the provision of home care services, with varying levels of service and quality.

Home care resources have failed to keep up with the trend towards shifting patient care from the hospital to the community. In addition, home care resources are increasingly devoted to short-term, post-acute care (e.g., follow-up post-surgery) rather than long-term care that is focused on the prevention of further decline, and the provision of care is shifting from the public to the private sector. As a consequence, family members (particularly those who cannot afford private home care) are being asked to do more, with potentially serious implications for their health and well-being.

Home care is provided by Personal Support Workers (PSWs), sometimes referred to as health aides, personal care aides, and health care assistants. These jobs can be difficult because they tend to be low-paying, demanding physically and emotionally, and precarious; often PSWs work more than one job to make ends meet. Picard (2020) reports that home care workers are paid $3 to $5 less than they would if they worked in an institution, and, due to staff shortages, they must work quickly to meet the needs of all clients. The workforce is most often female and foreign-born. Because they are an unregulated profession, they work long hours with increasingly complex home care clients, often without the necessary specialized training to meet the diverse physical, cognitive, and mental health needs of clients. There are few opportunities for career advancement. There is already a significant workforce shortage of PSWs, and this will become more severe as the population ages, a problem facing many countries, including Canada.

As you can see from Figure 12.6, the home and community care sector relies heavily on unpaid caregivers—family members, friends, and volunteers (MacDonald et al., 2019). Projections until 2049 indicate that the number of hours of unpaid care will increase significantly. According to Statistics Canada (2020a), one in four Canadians, aged 15 and older, provided care to a family member or friend with a long-term health condition, disability or aging need. Almost half are caring for parents or parents-in-law while 13 percent are caring for a partner or spouse.

Family caregivers are the linchpin of the health care system. About 75 percent of total home care hours are provided by unpaid caregivers, and this is expected to grow by 43 percent by 2050. Similarly, the number of older adults requiring care over the same time period will increase by 120 percent, from 345,000 to 770,000 (MacDonald et al., 2019). What is the economic value of this unpaid care? One way to look at this is how much it would cost the public system to replace this unpaid care, known as the replacement cost. In 2019, the replacement cost was just under $9 billion. By 2050, this will increase to $27 billion (MacDonald et al., 2019). But it is not just the monetary cost that should be considered but also the human cost. About 35 percent of unpaid caregivers are balancing work and unpaid caregiving activities. The percentage of caregivers reporting distress, anger, or depression related to their caregiving responsibilities increased in Ontario from 15.6 percent in 2009/2010 to 44 percent in 2013/2014 (Health Quality Ontario, 2016).

ADULT DAY PROGRAMS

Older adults who do not need to be in an institution on a 24-hour basis can receive support services during the day from community services specifically aimed at addressing their needs. In **adult day programs**, older adults who need assistance or supervision during the day receive a range of services in a setting that is either attached to another facility, such as a nursing home, or is a stand-alone agency. Depending on the site, the services provided can include medication management, physical therapy, meals, medical care, counselling, education, and opportunities for socializing. These services may fall into the category of **respite care**, which provides family caregivers with a break while allowing the older adult to receive needed support services. Being able to bring their relatives to these services for help during the day allows caregivers to maintain their jobs or spend time taking care of their own household or personal needs.

Supportive or Assisted Living

An alternative to a nursing home is a **supportive (or assisted) living facility**, which provides supportive care services and supervision to individuals who do not require skilled nursing care. The types of services provided varies, and can include social activities, meals, housekeeping, assistance with personal care, such as bathing and grooming, or access to an on-call nurse and/or non-regulated care provider. Facilities may be owned and operated by private, for-profit companies, by non-profit organizations (some of which may be faith-based), or by the government and owned and operated by local municipalities.

It is important to remember that supportive living facilities are not the same as retirement homes and residences, which are private accommodations that provide services such as meals and laundry for functionally independent older adults. In some residences, minimal nursing care is also available. These facilities tend to attract wealthier older adults and are often quite lavish.

Nursing Homes

For individuals whose illness or disability requires daily nursing care as well as other support services, nursing homes provide comprehensive care in a single setting. A **nursing home** is a type of medical institution that provides a room, meals, skilled nursing and rehabilitative care, medical services, and protective supervision. The care provided in nursing homes includes assistance for problems that residents have in many basic areas of life, including cognition, communication, hearing, vision, physical functioning, continence, psychosocial functioning, mood and behaviour, nutrition, and dental care. To manage these problems, residents typically need to take medications on a regular basis. The Ontario Long-term Care Association (2019) reported that 61 percent of residents take 10 or more prescriptions, while 86 percent need extensive help with activities such as eating and using the washroom.

Hero Images/Getty Images, Inc.

What many people forget is that a nursing home should be, most importantly, a place to call home for residents and is often the last place a person will live.

A nursing home may also have a rehabilitation unit in which residents receive intensive treatment to restore previous levels of functioning. Rehabilitation units typically include occupational and physical therapy services in addition to medical care. Referring back to Figure 12.1, acute rehabilitation typically follows hospitalization.

This description of a nursing home, although technically correct, neglects the most important feature. A nursing home is a "home," and for many older adults, it is the last place they will reside. While this fact may seem obvious to some, models of nursing home care have typically been custodial or institutional in nature. Residents have their basic physical needs met, often in a regimented manner, but their psychosocial needs are less of a priority. There has been a culture change in recent years, with a movement towards more holistic care, providing psychological, social, and spiritual care as well, although there is considerable variability in the extent to which different facilities provide this care. Also increasingly popular in the long-term care literature are terms such as *person-centred care* and *family-centred care*. These terms address the need for making residents and their family members the focal points for care, ensuring that their needs take priority over bureaucratic rules and regulations. While progress has been made in these areas, we still have a long way to go and there is tremendous variability across nursing homes in achieving person- and family-centred care.

Long term care facilities in Canada are funded by both public and private (for-profit and non-profit) providers. Private for-profit care includes large multinational or local chains and private equity firms. In 2014, according to the Canadian Institute for Health Information, 44 percent of facilities were private, for-profit entities, in contrast to 29 percent private non-profit and 27 percent public providers (CIHI, 2014a). The for-profit sector is growing in Canada, as large corporations increase their market share of the long-term care industry and access to publicly funded care has decreased. There is also a trend towards sub-contracting with other companies for services such as direct resident care, cleaning, or meal provision. Contracts are given to those providing the lowest cost, which can further diminish the quality of care provided to residents. For example, in the area of staffing this can mean lower wages, fewer benefits, and more part-time positions. This leads to poorer continuity of care for residents, as many staff rotate through the facility. This was a significant problem during the COVID-19 pandemic, as many staff had to work at multiple facilities to ensure a living wage, thus putting residents at greater risk of infection.

Research that has compared non-profit and for-profit care facilities has generally concluded that for-profit providers have large revenues but more documented quality problems. For example, Harrington et al. (2017) compared the five largest for-profit chains in five countries: Canada, Norway, Sweden, the United Kingdom, and the United States. Taken together, data suggested that large, for-profit nursing home chains did not provide quality services, as measured by quality violations, had more fraudulent practices, and lower staffing levels, particularly among registered nurses who have the highest salaries and the most expertise. Keep in mind that quality of care can range in both non-profit and for-profit care facilities and that these are aggregate data that do not tell us very much about individual facilities or specific jurisdictions. For example, data from Ontario suggest there are no differences in quality between for-profit and non-profit facilities (Ontario Long-Term Care Association, 2019). However, what is clear is that we need better accountability and oversight of all types of nursing home facilities and additional research on this important topic.

There is general recognition that there is a shortage of long-term care beds in Canada, with many older adults waiting for placement in hospitals, in their own homes, or living with caregivers. The Conference Board of Canada (2017) estimates that an additional 199,000 long-term care beds will be needed by 2035, nearly double the current capacity. Shortages are particularly acute in First Nations communities. A report by the Standing Committee on Indigenous and Northern Affairs (2018), presented to the House of Commons, indicated that there are over 630 First Nation communities across Canada and only 53 long-term care facilities are managed by First Nations. For example, 10.7 percent of the population of Saskatchewan are First Nation members; yet, there are only two facilities run by First Nations. As a consequence, First Nations elderly needing care have to be transported to communities far from their families and the languages, cultural practices and traditions that are so important to them. In turn, leaving the community deprives the younger people of the support, advice, and knowledge of Elders.

Relatedly, there is an increased emphasis on providing nursing homes that meet the unique needs of older adults from different ethnocultural groups. For example, in Calgary, the Chinese Christian Wing Kei Nursing Home Association provides care for Chinese elderly. As you can imagine, having access to staff and residents who speak your own language, eating familiar food, and being in an environment where your customs and values are recognized add immeasurably to your overall quality of life.

imtmphoto/Shutterstock.com

Due to a shortage of nursing homes in their communities, Indigenous Elders often have to leave their communities to receive care with negative consequences for them and for those they leave behind.

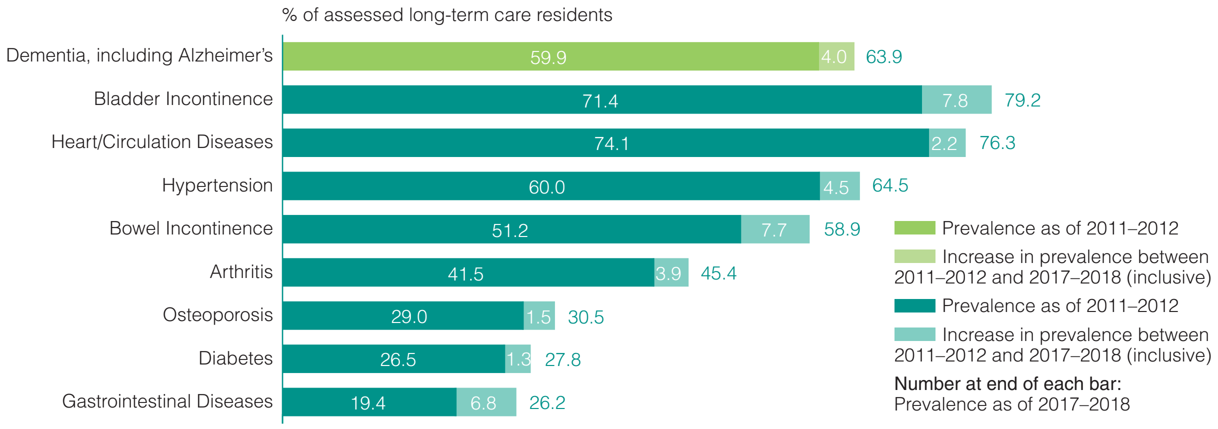
One of the major trends in nursing homes is greater acuteness and complexity in residents' health and cognitive status. As a result of policies that promote staying at home as long as possible, when older adults are admitted to nursing homes, they are more likely to have multiple health conditions and cognitive impairment, and the level of care they require is higher than ever before.

Figure 12.7 shows the increases in severity in Ontario nursing homes between 2011–2012 and 2017–2018, a trend that is present across Canada. As you can see, about two-thirds of residents have dementia, and bladder and bowel incontinence is present in 79.2 percent and 58.9 percent of residents, respectively. This means that many more residents require assistance with toileting. The percentage of residents needing extensive support for grooming, getting dressed, and eating rose from 79 percent to 86 percent from 2013 to 2018 (Ontario Long-Term Care Association, 2019). As with home care, Personal Support Workers (PSWs) are responsible for providing the majority of care, but there is a significant workforce shortage, as will be discussed later in the chapter.

The increasing severity and complexity of residents' needs has significant implications for the institutional milieu. For example, behavioural symptoms such as physical aggression, social inappropriateness (e.g., disrobing), resistance to care, repetitive motions or speech, pacing and wandering can result in very difficult living and working environments. As indicated above, while 2 out of 3 residents has dementia, 1 out of 3 residents has severe cognitive impairment and nearly half exhibit some form of aggressive behaviour (Ontario Long-Term Care Association, 2019). These behaviours are very upsetting for residents, family members, and staff, and they put staff at risk for physical injury. You might wonder why a resident would

FIGURE 12.7

Health Conditions and Care Needs Have Increased Since 2011–2012



This graph shows the increase in the prevalence of selected health conditions among long-term care residents between 2011–2012 and 2017–2018.

Source: Ontario Long-Term Care Association. (2019). *This is long term care 2019*. Toronto, ON: Author. Retrieved from https://www.oltca.com/OLTCA/Documents/Reports/TILTC2019web.pdf

demonstrate these behaviours. People with cognitive impairment have significant memory impairment and are confused. They may not remember the staff member who is trying to provide care. What would it be like to have someone who is unfamiliar to you helping you with your most personal care needs, such as bathing and toileting? How would you react to this scenario? Wandering away from a nursing home puts residents at significant risk, which is why some nursing home units are locked. Moreover, residents with cognitive impairment who are confused and disoriented may wander into the rooms of other residents, invading their privacy and sometimes taking their personal possessions. As you can see, addressing these behavioural problems presents a significant challenge to maintaining quality of life for residents and a positive working environment for staff.

Mood and anxiety disorders are also very prevalent in nursing home residents. In Canada, it is estimated that up to 44 percent of nursing home residents have depressive symptoms (Canadian Institute for Health Information, 2010). These data reflect symptoms of depression but do not address how many residents meet criteria for major depressive disorder, a more serious mental health problem. In their systematic review, Seitz et al. (2010) found a very large range of estimates at 5 to 25 percent for major depression and 14 to 82 percent for depressive symptoms. It is likely that these rates of depression are an underestimate, as depression in nursing homes often goes undiagnosed and untreated. The epidemiological data for anxiety symptoms is sparse, but one study reported that they were present in about 30 percent of residents (Smalbrugge et al., 2005). We do know that depression, anxiety, and cognitive impairment are highly comorbid. These mental health problems are also highly comorbid with physical illness. Thus, nursing home residents often have very complex physical and psychological needs.

The use of psychotropic medication to control disruptive behaviour and treat mood disorders is a serious problem in nursing homes. A study by the Canadian Institute for Health Information (2014b) showed selective serotonin reuptake inhibitors, used for depression, were taken by 36.1 percent of residents and other antidepressants were taken by 32.6 percent. They were the second and third most commonly prescribed drugs in long-term care settings. Pharmacological treatment is used to address depressive symptoms because psychological treatments, although highly efficacious, are not available to residents. Furthermore, antipsychotic drugs were used by 26 percent of residents. Although these are typically used for mental health problems such as schizophrenia and bipolar disorder, in long-term care they are often used to reduce disruptive behaviour. Unfortunately, these drugs can have serious side effects, including oversedation, orthostatic hypotension (a form of low blood pressure that causes dizziness when standing), and movement disorders. As a result, residents who are on these drugs are more susceptible to falls.

However, progress is being made in Canada. For example, data from Health Quality Ontario (2018) reported that the percentage of residents receiving an antipsychotic medication when they didn't have psychosis fell from 35 percent in 2010/2011 to 20.4 percent in 2016/17. Similar data were reported for the use of physical restraints, from 16.1 percent to 5.1 percent. A review by Van Leeuwen et al. (2018) suggested that some residents with dementia could be withdrawn from antipsychotic medications without serious effects on their behaviour; however, this is more likely true for residents with mild to moderate symptoms. Those with more severe behavioural and psychological symptoms would likely benefit from continued use of antipsychotic medication.

There are alternatives to medication and restraints for controlling behaviour. In their review of the literature, Chappell et al. (2014) reported that musical interventions and staff training were promising interventions for agitation and aggression. They also identified additional "possibly effective" interventions, as follows: animal-assisted therapy, aromatherapy, dance therapy, pain treatment, personalized activity schedules, person-centred bathing, and simulated family presence therapy. In general, these interventions require more staff, additional training for staff, and a greater institutional commitment to person-centred care.

RELOCATING TO A LONG-TERM CARE FACILITY

Any discussion of long-term care would not be complete without considering the process of relocation. We use the term *process* because it truly is an event that evolves over time and is often the end point of heroic efforts on the part of family members to keep their loved ones in their own homes in the community. Relocation is most often the result of cumulative frailty (physical and/or cognitive), and many relocations are precipitated by a catastrophic health event, such as a fall or a stroke. However, as indicated earlier in this chapter, there are also systemic reasons for older adults being admitted to facility-based long-term care, including a lack of home care resources and funding (either public or personal) and the unavailability of residential options that provide lower levels of care. Unfortunately, as is the case in many aspects of life, those who have money fare better and can afford high-end options, such as private retirement living with extended health care services.

Relocating a family member to long-term care can be a very difficult experience for families and is often associated with feelings of regret, grief, depression, and even relief. Recognizing this, on its website, the Alzheimer Society of Canada addresses the process of relocation, including making the decision, assessing different facilities, the actual move, and adjusting once a family member is placed in care. Family members are often unfamiliar with the policies and practices that are involved in the transition to long-term care and may feel overwhelmed by the process. In Canada, admission to long-term care is through a coordinated placement process, or single point of entry model, referred to variously as screening, referring, and case-managing (Canadian Healthcare Association, 2009). In the single point of entry model, long-term care is accessed through one agency, with the goals of facilitating access, providing the most appropriate placement for the individual, and reducing wait-lists. However, older adults may not have much choice in terms of where they live. Although policies vary across Canada, they may require that older adults take the “first available living option” rather than their first-choice option, perhaps because the preferred residence is full or there is limited capacity within the long-term care system. Family members often need to make relocation decisions in response to a health crisis and may feel pressured to make a decision, often in the absence of adequate information about waiting times for specific nursing homes or without their input about preferred sites (Health Quality Council of Alberta, 2014).

Although it may be possible to eventually move older adults to their first-choice nursing home if it becomes available, relocation requires a significant adjustment, and every relocation adds to the cumulative stress that they experience. In their review of evidence-based interventions for successful residential transitions for people with dementia and their family members, Hirschman and Hodgson (2018) provided five guiding recommendations: 1) adequate preparation and education about the transition process with informational resources; 2) complete and timely written and verbal communication across settings as individuals move from one care setting to another; 3) an evaluation of individuals’ and caregivers’ personal preferences and goals, for example, around treatment and social and living situations; 4) strong interprofessional collaboration among team members (e.g., social workers, nurses, physicians) involved in supporting the transition; and 5) the use of existing evidence-based models of care to inform the relocation process. These best practices enhance the experience of relocation for relocating older adults and their caregivers. It is also important to remember that some older adults have positive outcomes when they relocate, particularly if they have had inadequate support in their home and community, and are poorly nourished and/or on multiple medications that either may not be appropriate for them or are being taken incorrectly.

With increased geographic mobility, it is not uncommon for adult children to live far from their parents. When it is time to relocate one or both parents, children often want them to be closer so that they can visit them and oversee their care in a nursing home. But each jurisdiction in Canada has its own residency requirements for accessing long-term care, and, even within provinces, these may vary depending on the level of care that is required. These regulations may come as a surprise to many adult children who simply want their parents to be closer.

PSYCHOLOGICAL ISSUES IN LONG-TERM CARE

Models of adaptation to the institutional environment attempt to explain the factors that contribute to a facility’s ability to meet the psychosocial needs of its residents. The basic problem that institutions face in providing for the needs of its residents is that, as institutions, they must try to meet the need of the “average” resident. Consider the case of temperature. It is more cost-effective for institutions to be built with one heating and cooling system rather than providing individualized thermostats within each room. Other features of the environment, from lighting to dining menus, similarly, cannot be individually tailored to each resident’s needs.

Add to this problem of meeting the average resident’s needs is the fact that people will differ considerably in the ways they perceive the same physical features of the environment. Take room temperature as an example. You have probably been in classes in which one student is wearing an overcoat and another is wearing shorts and a tee shirt. The subjective environment, then, becomes an added complication for institutions to take into account when designing and maintaining a facility.

The ability to control your environment is another factor that will determine how well you are able to adapt to it. In your own home, you make your own decisions about how your environment looks and feels. You set your own hours for eating, sleeping, waking, and bathing. In an institution, you may have these decisions made for you by the staff. A study of nursing home residents in Victoria, British Columbia revealed that the ability to control the environment was indeed important to certain residents. Interviewers presented the residents with vignettes asking them to make decisions such as what time to go to bed, what medicines to take, whether to move to a different room, and what type of end-of-life care to receive. The researchers found that, perhaps unexpectedly, not everyone wanted to have this type of control over their health care decisions. Older adults with more years of education and a greater number of chronic illnesses were likely to state that they wished to be able to make these decisions themselves rather than have them made for them by nursing home staff (Funk, 2004).

As you can see, institutions present residents with environments that meet their needs to varying extents. In the ideal situation of maximum adaptation, residents feel that they are a good fit in their environment. This principle of person–environment fit underlies the **competence–press model** (Lawton & Nahemow, 1973), which predicts an optimal level of adjustment that institutionalized persons will experience when their levels of competence match the demands, or “press,” of the institutional environment.

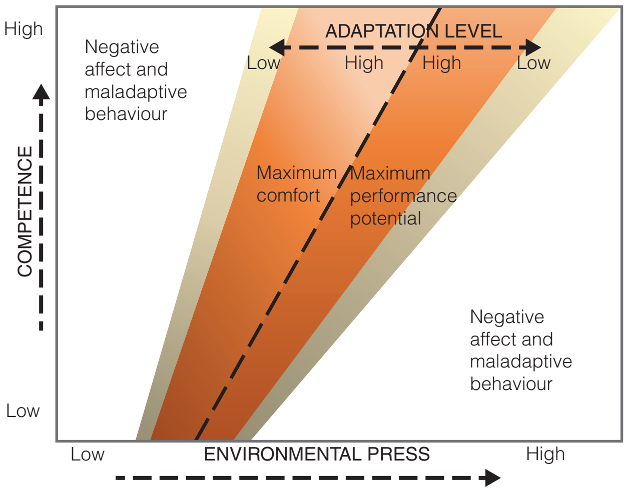
Figure 12.8 illustrates the competence–press model. The qualities of the individual, psychological and physical, can range from low to high in competence. A highly competent resident will be able to get around easily, is cognitively intact, and is relatively free from depression. Institutions, for their part, can range from low to high in press. An environment low in press will be relatively low in stimulation. One that is high in press will have high expectations for residents to be active.

As you can see, there is a boundary around the perfect fit between competence and press (dashed line). That zone incorporates maximum comfort and maximum performance potential, or ability to be as satisfied and independent as possible. Adaptation, in this middle zone, will be high. As you move towards the edges, adaptation drops and individuals express negative affect and engage in maladaptive behaviour such as, in the extreme, being aggressive towards staff. The individual who is intellectually competent is best adapted, then, in a highly stimulating environment, and residents who have diminished capacity will be best adapted in a less stimulating environment.

Looking now at the range of maximum adaptation, it is clear that residents low in competence have a narrower band that will define their feelings of comfort and ability to perform. Cognitively and physically more competent residents may be bored in a less stimulating environment than in one suited towards their abilities, but they will have the capacity to find ways to keep from getting bored.

FIGURE 12.8

Competence– Press Model


High
Low
COMPETENCE
Negative affect and maladaptive behaviour
ADAPTATION LEVEL
Low
High
High
Low
Maximum comfort
Maximum performance potential
Negative affect and maladaptive behaviour
Low
ENVIRONMENTAL PRESS
High

According to the competence–press model, environments vary in their levels of press, or stress, and therefore in the maximum level of affect and adaptation they provide.

By considering the interaction between the individual and the environment of the institution, the competence–press model makes it possible to provide specific recommendations to institutions about how best to serve the residents. The model also predicts the adaptations individuals might make to changes in health as they seek environments that will best support their ability to maintain their independence (Perry et al., 2014).

Environments can also adapt to the competence of residents whose cognitive abilities are diminished by neurocognitive disorder. Specifically, such environments should meet the criteria of being safe and secure, be visually accessible, minimize memory requirements, provide opportunities for a range of social interactions, and support the values and goals of care (Fleming & Bennett, 2015). Cognitive supports, furthermore, can help promote the social well-being of residents by enhancing their ability to navigate the environment (Nordin et al., 2017a). In Canada, facilities that provide these types of supportive environments for residents with cognitive impairment may be referred to as special care units or memory care units.

THE QUALITY OF LONG-TERM CARE FACILITIES

Since long-term care facilities provide for the needs of some of our most vulnerable citizens, maintaining high standards and quality care is vitally important. This was particularly evident when the COVID-19 pandemic took the lives of many nursing home residents across Canada, and serious deficiencies were exposed in many care facilities.

Information about the quality of nursing homes and the well-being of nursing home residents comes from the Continuing Care Reporting System (CCRS). As of 2017 to 2018, the following provinces were participating partially or completely in the CCRS: Yukon, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, New Brunswick, Nova Scotia, and Newfoundland and Labrador. Over 500 indicators are included in the reporting system, known as the Resident Assessment Instrument—Minimum Data Set 2.0, including indices of physical, cognitive, and psychosocial health. Data are collected at the point of care, using standardized assessment forms. The Canadian Institute for Health Information (CIHI) uses these data to monitor quality indicators in long-term care facilities and assesses trends in quality over time. These data are used routinely but also in times of crisis. For example, CIHI released a report in June of 2020 comparing the number of COVID-19 deaths in long-term care in Canada with 16 other OECD countries. These data revealed that, in Canada, 81 percent of all COVID-19 deaths occurred in long-term care, compared to an average of 42 percent across the other countries (CIHI, 2020).

In addition, each province and territory has licensing requirements that nursing home operators must meet in order to keep their operating licences. These regulations are often quite detailed and include requirements for, for example, the physical environment, diet and nutrition, accommodating residents' personal choices (including their social and leisure preferences), and providing a forum for resident feedback. Although these licensing requirements are good, they tend to focus more on environmental factors and indices of poor health care, while psychosocial aspects of care and overall quality of life receive less attention. Additionally, there is ongoing concern about whether there is sufficient monitoring. For this reason, some provinces have passed specific legislation to protect persons in care, and a number of citizen advocacy groups across Canada are actively involved in enhancing the quality of life of residents.

Accreditation Canada accredits more than 1,100 health care and social service agencies. Site visitors use nationally recognized and rigorous standards to evaluate facilities, noting both strengths and areas that need improvement. The recommendations made by the accreditation team are implemented prior to the next survey so that there is continuous quality improvement. Accreditation status provides an additional metric for determining the quality of a facility.

Provincial initiatives also aim to improve the quality of care. For example, Ontario's Long-Term Care Home Quality Inspection Program involves unannounced inspections and enforces legislation and regulations. Inspections by trained and certified professionals can be comprehensive or can be related to complaints, critical incidents, and follow-up. Most importantly, there is transparency, because inspection reports are made available through the Ontario Ministry of Health and Long-Term Care.

Courtesy of Campus Alberta Central

Staff members are vitally important in ensuring good quality of care in nursing homes.

As emphasized throughout this chapter, human resources are the key to quality care in nursing homes. The most obvious requirement is sufficient staff to meet residents' needs. However, it is becoming increasingly difficult to recruit and retain long-term care staff. Employment in long-term care is very stressful. Banerjee and colleagues (2012) surveyed 948 staff in Canadian long-term care facilities and found that 43 percent of front-line workers reported that, more or less every day, they were subjected to physical violence, 35.5 percent were criticized or told off by a resident or relative, and 14.3 percent endured unwanted sexual attention, which often occurred when bathing a resident. Focus-group data also indicated that front-line workers were often the recipients of sexist and racist remarks. The vast majority of violence was unreported, primarily because of the amount of paperwork involved and fears of being blamed by superiors. Banerjee and colleagues (2012) attributed the violence to excessive workloads resulting from staff shortages. Workers reported that they had barely enough time to complete the physical care, let alone socialize with residents or provide emotional support. Additional factors that workers cited as contributing to violence were low levels of job autonomy and the lack of opportunities to talk to other workers about difficulties that arise on the job. Interestingly, rates of violence in Canadian long-term care facilities were much higher than in Scandinavian countries. Banerjee and colleagues (2012) cited structural factors, such as higher workloads in Canadian facilities, as important in understanding these differences. For example, Canadians were responsible for almost twice as many residents as their Scandinavian counterparts in Denmark, Norway, and Sweden.

The prevalence of violence, combined with the fact that nursing home work is generally perceived as low status and is often undervalued, leads to burnout, high staff turnover, chronic staff shortages, and ultimately poorer quality of care for residents. Staffing shortages are directly related to inadequate operating budgets, and long-term care associations have repeatedly called upon provincial governments to increase funding for long-term care (Canadian Healthcare Association, 2009b).

However, it is not just a matter of having enough staff but also of having the right mix of staff. The trend has been towards hiring more personal support workers and fewer registered nurses as a way of cutting costs. In addition, many allied health care professionals—physiotherapists, occupational therapists, recreational therapists, social workers, and psychologists—are either in short supply or non-existent in many long-term care settings in Canada. As a result, many residents do not get the physical and psychosocial support that they need in order to maintain a good quality of life.

Adequate staff training is also essential for those working in long-term care. Sadly, many staff members do not have specialized training in working with older adults. Moreover, those who have the most direct contact with residents have the least education. The curriculum for personal support workers is not uniform across Canada, and there are areas where they clearly receive little training. For example, most do not receive training in mental health, in spite of the fact that a significant number of residents have mental health problems. Other topics deemed critically important for staff working in long-term care are residents' rights, cultural competency, resident-centred care, and behaviour management (Canadian Healthcare Association, 2009b).

As a consumer, you may be interested in how to choose a nursing home that provides quality care. This may seem like a topic that lacks relevance for you, but there is a high probability that you and/or someone you know may be relocating to long-term care sometime in the future. Fortunately, there are resources to help you. For example, the Alzheimer Society of Canada provides a checklist to assist in selecting a long-term care home for someone with Alzheimer's disease or other major neurocognitive impairment (Figure 12.9).

SUGGESTIONS FOR IMPROVING LONG-TERM CARE

Clearly, the environment has an important role in affecting the individual's health, both inside and outside an institutional environment. Within the institutional setting, the implications of the competence–press model are that the needs of individuals should be met to the greatest extent possible. For example, one approach to intervention for patients with neurocognitive disorder who exhibit agitation is to develop an individualized "algorithm" that matches interventions with the abilities and preferences of the residents. Rather than treating this behaviour with medications, which is the typical route of treatment, the non-pharmacological approach can better preserve the resident's ADLs, speech, communication, and responsiveness (Cohen-Mansfield et al., 2014).

Personal support workers, who increasingly are managing many of the daily living activities of residents (Seblega et al., 2010), can be taught to use behavioural methods to help residents maintain self-care and hence independence (Burgio et al., 2002). Such interventions can also benefit staff–resident relationships. Since satisfaction with treatment by staff is such a significant component of satisfaction with the institution (Chou et al., 2002), any intervention that maximizes positive interactions between staff and residents is bound to have a favourable impact on the sense of well-being experienced by residents. Such training, even with patients who have severe dementia, can help reduce dependence on psychotropic medications (Fossey et al., 2006).

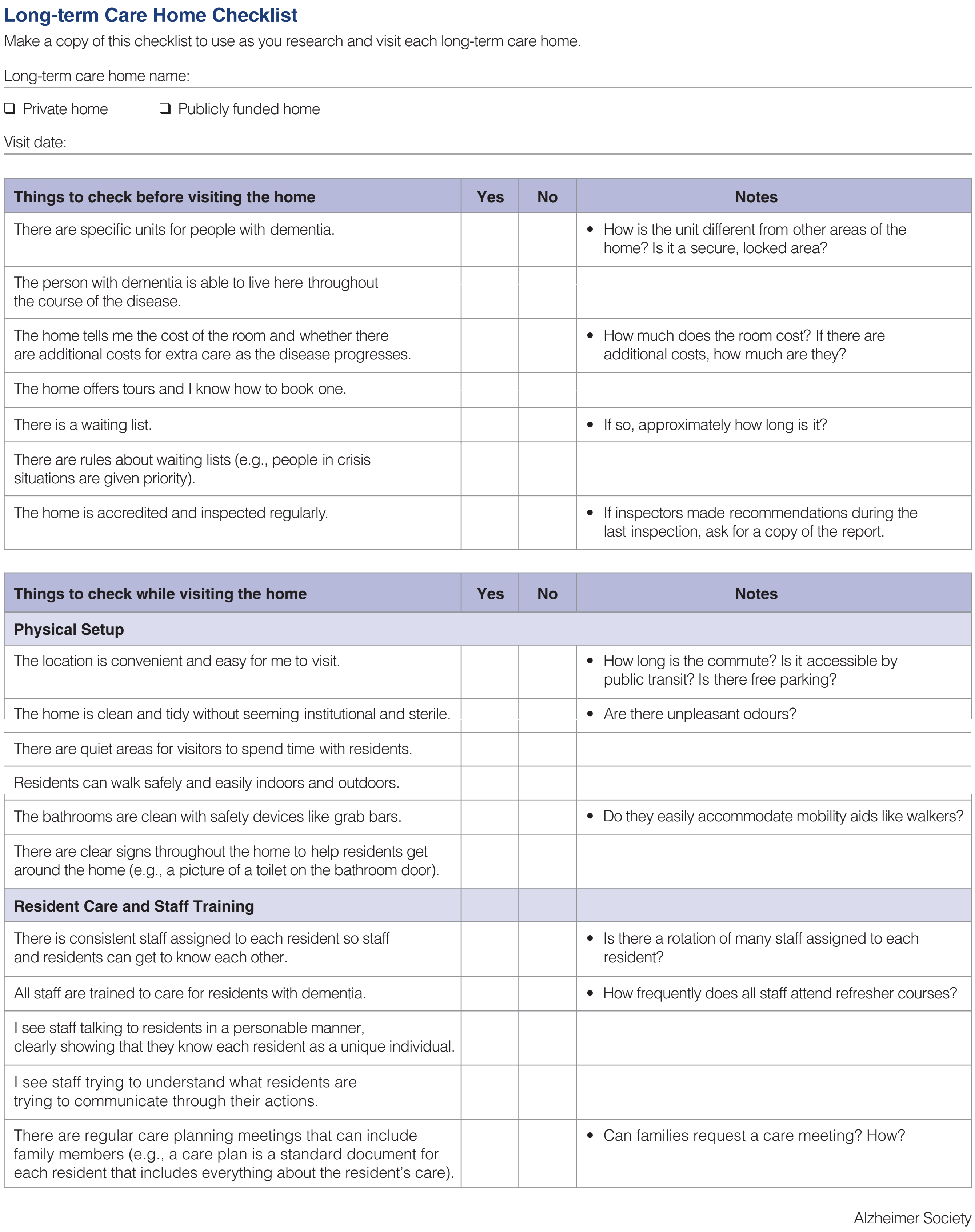
The size of the institution can also affect the adaptation of residents. The typical long-term care facility design is similar to that of a hospital, with long hallways and centralized lounge areas and nursing stations. New models for nursing home design attempt to break up the monotony to create a heightened feeling of a community or neighbourhood. Nursing stations are removed from view, allowing residents and staff to share lounges. Hallways have alcoves that can store medicine carts and nursing stations. Small group living clusters, improved interior design, and access to gardens can help maintain independence in residents whose autonomy would otherwise be threatened (Regnier & Denton, 2009). Even if the rooms themselves are well designed, then, the overall layout becomes an important factor in determining how easy or difficult it is for residents to benefit from social interactions among themselves (Nordin et al., 2017b).

Other models stress new ways of allocating staff to meet the care needs of residents. In one such model, rather than basing staff assignments on the completion of specific tasks for all residents (bathing, changing dressings, administering medications), staff are assigned to meet all the needs of a particular group of residents. Although such a system increases staffing requirements, overall the institutions reduce their expenses in the areas of restraint and antipsychotic medication. Hospitalization rates, staff turnover, and success in rehabilitation also improve, as does residents' satisfaction with their care (Bartels et al., 2002). Residents with chronic physical illnesses or neurocognitive disorders who also have psychiatric conditions can benefit from a multidisciplinary approach that involves thorough assessment of psychiatric, medical, and environmental causes as well as programs for teaching behavioural management skills to nurses (Collet et al., 2010).

Another factor to consider in understanding the psychological adaptation of the older adult to the institutional environment is the possibility that a nursing or residential care home may represent an improvement over a private residence. Researchers in Finland found that nursing home residents had a greater sense of well-being than those living at home, many of whom were no longer able to care for themselves. Because many residential facilities for older adults have long waiting periods, particularly the better ones, older adults may be relieved to be admitted where they know they will be relieved of the burden of living on their own (Böckerman et al., 2012).

FIGURE 12.9

Long-Term Care Checklist from the Alzheimer Society of Canada



Long-term Care Home Checklist

Make a copy of this checklist to use as you research and visit each long-term care home.

Long-term care home name:

☐ Private home ☐ Publicly funded home

Visit date:

Things to check before visiting the home	Yes	No	Notes
There are specific units for people with dementia.			• How is the unit different from other areas of the home? Is it a secure, locked area?
The person with dementia is able to live here throughout the course of the disease.			
The home tells me the cost of the room and whether there are additional costs for extra care as the disease progresses.			• How much does the room cost? If there are additional costs, how much are they?
The home offers tours and I know how to book one.			
There is a waiting list.			• If so, approximately how long is it?
There are rules about waiting lists (e.g., people in crisis situations are given priority).			
The home is accredited and inspected regularly.			• If inspectors made recommendations during the last inspection, ask for a copy of the report.

Things to check while visiting the home	Yes	No	Notes
Physical Setup			
The location is convenient and easy for me to visit.			• How long is the commute? Is it accessible by public transit? Is there free parking?
The home is clean and tidy without seeming institutional and sterile.			• Are there unpleasant odours?
There are quiet areas for visitors to spend time with residents.			
Residents can walk safely and easily indoors and outdoors.			
The bathrooms are clean with safety devices like grab bars.			• Do they easily accommodate mobility aids like walkers?
There are clear signs throughout the home to help residents get around the home (e.g., a picture of a toilet on the bathroom door).			
Resident Care and Staff Training			
There is consistent staff assigned to each resident so staff and residents can get to know each other.			• Is there a rotation of many staff assigned to each resident?
All staff are trained to care for residents with dementia.			• How frequently does all staff attend refresher courses?
I see staff talking to residents in a personable manner, clearly showing that they know each resident as a unique individual.			
I see staff trying to understand what residents are trying to communicate through their actions.			
There are regular care planning meetings that can include family members (e.g., a care plan is a standard document for each resident that includes everything about the resident's care).			• Can families request a care meeting? How?

Alzheimer Society

This list provides information about what to look for when you research and visit each long-term care home.

FIGURE 12.9

(*Continued*)

Things to check while visiting the home	**Yes**	**No**	**Notes**
Resident Care and Staff Training..*cont'd*			
With consent, the home shares information about the resident readily and routinely with family members.			• How does the home share the information? • If I have concerns, who is my main contact?
There is a doctor on call.			• Can a resident keep their family doctor if they like? • What are the pros and cons of this decision?
The home has access to other services (e.g., opticians, dentists, physiotherapists, chiropodists (foot care), hairdresser).			• Are there costs for these services?
Staff uses restraints (e.g., seatbelts in wheelchairs, bedrails, antipsychotic medications) and I can see a copy of the restraint policy.			• If yes, when and why? • Is this something I am comfortable with?
Medical emergencies are handled appropriately.			• How are medical emergencies handled? • Under what circumstances are residents transferred to hospital?
Staff is able to provide palliative care (to reduce distress and provide enhanced comfort, dignity and pain control at end-of-life stage).			
Daily Life			
Each resident has a flexible daily routine (e.g., home can accommodate a resident who is used to having breakfast at 11am).			
The menu is good in all important ways (e.g., varied, appealing, nutritious, and can accommodate special dietary needs).			
The home considers different cultural, religious, and spiritual needs.			• Do I have specific cultural, religious, or spiritual issues to ask about?
There are a variety of meaningful activities for groups and individuals.			• What are they? • Are they available during evenings and weekends? Ask for a program schedule. • Is there a volunteer visiting program for additional one-on-one support?
I see residents that are inactive (e.g., falling asleep in front of the television).			
The visitors' policy suits the needs of the person with dementia and my needs as a visitor.			• What is the policy regarding visits? • What are the visiting hours? • Can a caregiver or friend sleep over to comfort and assist a sick resident?
The home allows visitors to join the resident for meals.			• Is there a cost?

Your overall impression:
Rate the long-term care home on the following scale:

1 2 3 4 5 6 7 8 9 10

I would never consider moving the person with dementia to this home.

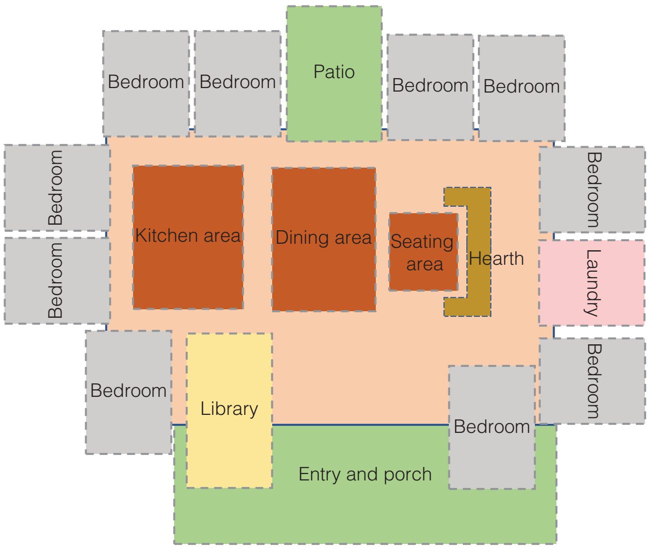
I would consider this long-term care home as one of the best options.

Comments:

Alzheimer Society

FIGURE 12.10

Green House Design



This is a sample layout of a nursing home with the Green House design. Note the presence of a hearth and central dining and kitchen areas.

The **Green House model** offers an alternative to traditional nursing homes by offering older adults individual homes within a small community of 6 to 10 residents and skilled nursing staff. Figure 12.10 shows the design of a typical Green House residence. A key feature of this design is the open-plan layout of shared spaces, with the centerpiece being the hearth and surrounding seating area. As you can see, the Green House residence is designed to feel like a home; medical equipment is stored away from sight, the rooms are sunny and bright, and the outdoor environment is easily accessible. Data from longitudinal studies of the Green House model have recently become available. As you might expect from seeing the layout of a typical Green House design, residents in these facilities are more likely to engage in social interaction than residents of traditional long-term care facilities. Somewhat surprisingly, though, one study identified along with this increase in social interaction an increase in depressive symptoms as well, perhaps due to greater recognition of these symptoms in the open-plan setting (Yoon et al., 2015).

The Green House Model is consistent with principles of the **Culture Change Movement** in services for older adults (Bowers et al., 2016), which promotes person-centred care, allowing individuals to feel "at home" despite living in institutional settings. The goal of the Culture Change Movement is to transform services for older adults by adopting care to the needs of the individual in innovative ways (Briody & Briller, 2017). However, researchers caution that despite its obvious appeal, the Culture Change Movement still requires more rigorous testing before it becomes translated into a more widespread policy (Shier et al., 2014).

In conclusion, the concerns of institutionalized older adults are of great importance to both individuals and their families, many of whom are involved in helping to make long-term care decisions for their older relatives. The dignity and self-respect of the resident can best be addressed by multidimensional approaches that take into account personal and contextual factors. Interventions based on these approaches will ultimately lead to a higher quality of life for those who must spend their last days, months, or years in the care of others.

SUMMARY

1. Long-term care is a provincial/territorial responsibility in Canada, and there is tremendous variability both within and across regions in how long-term care is structured and financed. Depending on where you live in Canada, the cost of living in a nursing home can be quite high. Facility-based care is not an insured service under the *Canada Health Act*. A nursing home is most importantly a home, and often the last place a person will reside. Person-centred care is an institutional culture that makes the resident the focal point of care, recognizing his or her unique needs, values, and history as well as his or her right to dignity and respect. Because of the increasing severity and complexity of residents' health, cognitive, and mental health problems, important research is focusing on how to decrease difficult behaviours among nursing home residents.
2. Family members provide most of the home care support for older adults, and they need more community resources and financial compensation to meet these commitments. Home care is cost-effective if it is well integrated into the health care system, and there are good linkages among and coordination of services. As is the case with facility-based care, home care is not covered by the *Canada Health Act* and there is considerable regional variability in the types of services provided, how much they cost, and the mix of public and private providers. Many types of long-term care settings specifically designed for older adults are available, such as nursing homes and supportive or assisted living facilities. The percentage of older adults in these institutions with cognitive deficits and mental health problems is relatively high, as is the use of psychotropic medications. Increasing attention is being paid to home health care to allow older adults who need some level of care to continue to live independently, a concept referred to as aging in place. Other residential sites include special housing that is designed for older adults.
3. Relocation to long-term care can be a stressful event for older adults and their family members. Many will have to take the first available living option and it may not be in their nursing home of choice. Alternate level of care patients are those who reside in the hospital while waiting for an appropriate

placement in a nursing home. This is an expensive option for the health care system and a poor living environment for older adults awaiting placement.

4. Psychological issues in long-term care focus on the provision of an environment that will maximally meet the needs of residents. The competence–press model proposes an ideal relationship between how demanding an environment is and the abilities of the resident to meet those demands. The environment of institutions is also becoming a concern of researchers, who are attempting to understand the relationship between well-being and feelings of safety and security in these facilities.

13

Death and Dying

Saying goodbye to loved ones is never easy, but there are ways to help with grief. Here are different strategies people use to remember and honour important people who have passed away:

AGEFEED

#TIPS

1. Starting new traditions for dates for holidays or anniversaries, such as a family gathering to commemorate those who have passed away.
2. Planting trees or gardens as a memorial.
3. Writing down memories about loved ones and referring to them during difficult times. Even the small, simple memories will have meaning for years to come.
4. Reading their favourite books.
5. Turning keepsakes into special mementos. Some opt to make favourite items into blankets, stuffed animals, or even artwork.
6. Encouraging others who knew the loved one to share their memories with you—you may learn things you never knew!
7. Playing their favourite music. Music has a way of bringing memories back to life and can help keep a connection.
8. Living life in a way that would make them proud.
9. Dedicating a bench, section of the highway, or other location meaningful to the loved one.
10. Finding meaning in lyrics to songs or seeing objects or animals and thinking of the loved one.

For many people, the concept of death is as fascinating as it is frightening. By definition, death remains the great unknown; even individuals who have had so-called near-death experiences cannot claim with certainty that what happened to them is an accurate prediction of what is to come in the future.

You may think occasionally about what death means to you and how you would approach the ending of your life. As people age, the concept of death takes on greater reality. Perhaps what most people wish for is to live a maximum health expectancy, which is the length of time an individual can live without significant disease and disability. In keeping with Erikson's concepts of generativity and ego integrity, many people also wish to leave something behind to be remembered by and to have made an impact on other people's lives.

From the biopsychosocial perspective, death and dying are best understood in a multidimensional manner. Death is, of course, a biological event, as it is the point in time when the body's functions cease to operate. However, this biological fact of life is overlaid with a great deal of psychological meaning, both to the individual and to those in the individual's social network. Socioculturally, death is interpreted in multiple ways, varying according to time, place, and culture.

WHAT WE KNOW ABOUT DEATH

According to the Law Reform Commission of Canada, the technical definition of **death** is the irreversible cessation of brain function that can be determined by the prolonged absence of spontaneous cardiac and respiratory functions. The term **dying** refers to the period during which the organism loses its vitality. These terms, as you will learn, are not always clear-cut, particularly with advances in life-support technology that allow people to be kept alive almost indefinitely after an organ vital to survival has failed. In fact, in 2019, Nova Scotia passed an act "Respecting Human Organ and Tissue Donation," which alters the definition of brain death to state "irreversible loss of the brain's ability to control and co-ordinate the organisms' critical functions" instead of the terminology of "irreversible cessation" (Nova Scotia Legislature, 2019).

Medical Aspects of Death

Although the death experience varies from person to person, there are some commonalities in the physical changes shown by a person whose functions are deteriorating to the point that death will occur within a few hours or days. In a dying person, the signs that death is imminent include being asleep most of the time, being disoriented, breathing irregularly, having visual and auditory hallucinations, being less able to see, producing less urine, and having mottled skin, cool hands and feet, an overly warm trunk, and excessive secretions of bodily fluids (Gavrin & Chapman, 1995). An older adult who is close to death is likely to be unable to walk or eat or to recognize family members, and may suffer constant pain and feel that breathing is difficult.

There are many variations in the dying process, which can make it difficult for health professionals to diagnose whether a patient is dying or not (Kennedy et al., 2014). However, there do appear to be some patterns in the dying process that can serve as guidance. These patterns are captured in the concept of the **dying trajectory**, which is the temporal pattern of the disease process leading to a patient's death (Glaser & Strauss, 1968). Although originally identified through qualitative interviews, subsequent epidemiological data support the validity of the dying trajectories (Lunney et al., 2003). Figure 13.1 illustrates the four types of dying trajectories. As you can see, they vary in their duration and shape and are associated with different causes of loss of function and death.

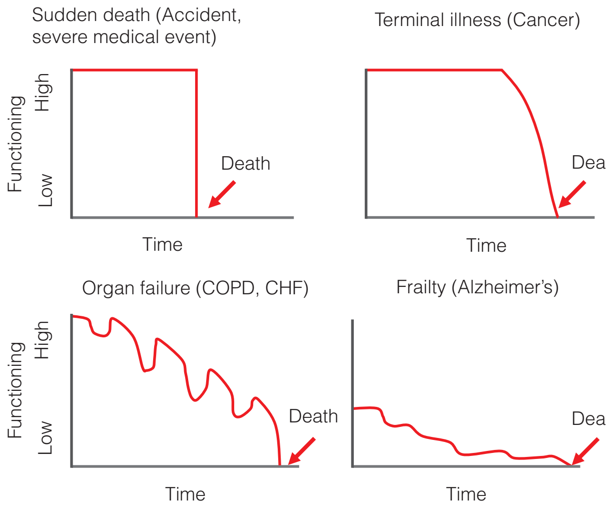
In sudden death, the individual is at a high level of functioning until the death suddenly occurs. The sudden death trajectory applies to people in good health whose death is due to an accidental cause. The sudden death trajectory can also apply to people who die due to an unanticipated medical event, such as heat stroke or sudden cardiac failure.

Moving now to the terminal illness trajectory, this applies to people who have advance warning of a terminal illness such as cancer. They were functioning at a high level until the disease progressed to the point at which the body could no longer sustain life (Teno et al., 2001). The third dying trajectory occurs in cases of death due to the progressive failures of organs as in COPD and chronic heart failure, as well as in other conditions such as kidney failure. The individual's death will occur over a prolonged period with a series of dips and recoveries until the organ failure completely compromises life.

Finally, the trajectory reflected by declines in functioning among frail individuals applies to people who have limited physical reserves. The pattern characterizes individuals in the later stages of Alzheimer's disease, for whom the immediate

FIGURE 13.1

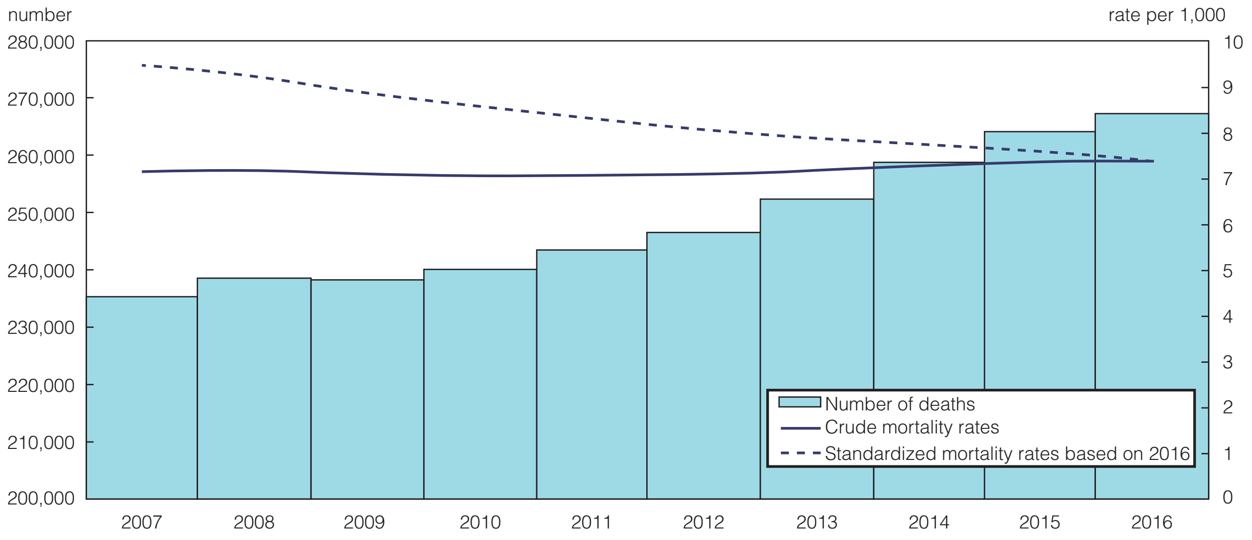
Four Types of Dying Trajectories



The four dying trajectories associated with different end-of-life patterns of functioning preceding death.

FIGURE 13.2

Number of Deaths, Crude and Standardized Mortality Rates, Canada, 2007 to 2016



Note: Data used was the most recent available at time of dissemination.

As shown in this figure, death rates are trending upwards, mostly due to population growth and population aging.

Source: Shumanty, R. (2018). *Report on the demographic situation in Canada. Mortality: Overview, 2014 to 2016.* (Catalogue no. 91-209-X). Ottawa, ON: Statistics Canada. Retrieved from https://www150.statcan.gc.ca/n1/pub/91-209-x/2018001/article/54957-eng.htm

cause of death may be an acute illness such as pneumonia developing against a backdrop of general loss of function.

A common syndrome observed at the end of life is the **anorexia-cachexia syndrome**, in which the individual loses appetite (anorexia) and muscle mass (cachexia). The majority of cancer patients experience cachexia, a condition also found commonly in patients who have AIDS and neurocognitive disorder. Patients who are dying are also likely to experience nausea, difficulty swallowing, bowel problems, dry mouth, and edema, or an accumulation of liquid in the abdomen and extremities that leads to bloating. Anxiety, depression, confusion, and dementia are also common psychological symptoms that people experience in their final days and hours.

These symptoms at the very end of life clearly create discomfort for the dying patient. Families also are affected by watching their loved ones suffer, as you may be able to attest from your own experience. Psychologists and other health care providers have become increasingly attuned to the need to provide services to assist patients and their families during the final stages of dying, as you will learn later in the chapter.

Death by the Numbers

Mortality data provide a fascinating picture of the factors within a given population that influence the course of human life. By knowing how to interpret statistics about death, you can gain a great deal of insight into the factors that contribute to living a long life.

The quickest way to gauge the health of a given region of the world or period in history is to find out who dies and when. According to definitions provided by Statistics Canada (2015b), the **crude death rate** is the number of deaths during a given year per 100,000 population as of July 1 of the same year. The **age-specific death rate** is the number of deaths in a particular age group during a given year per 100,000 population in the same age group as of July 1 of the same year. Thus, the age-specific death rate only indicates the likelihood of people dying within their own age group. The third mortality statistic is the **age-standardized death rate**. Age standardization removes the effects of differences in the age structure of populations among areas and over time. Age-standardized death rates show the number of deaths per 100,000 population that would have occurred in a given area if the age structure of the population of that area was the same as that of a specified standard population.

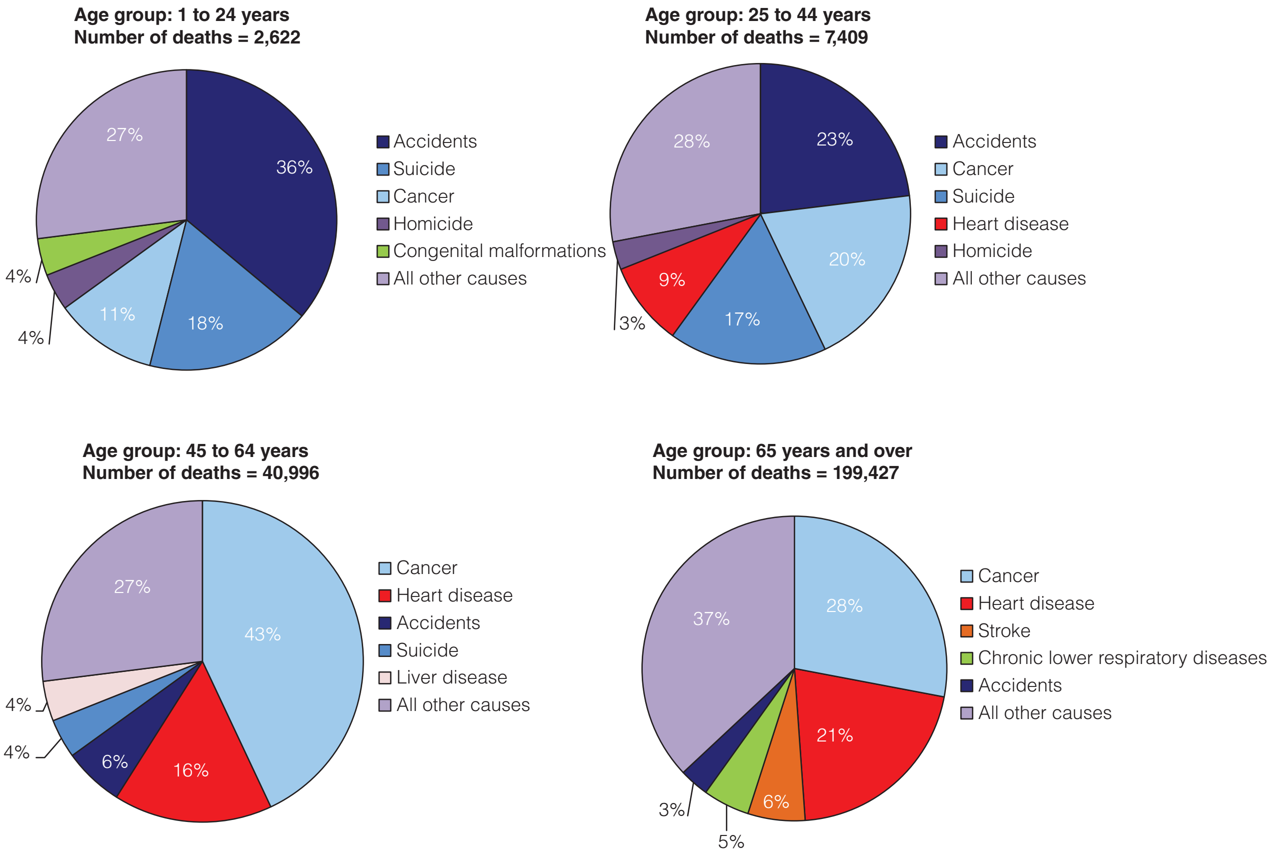
Figure 13.2 illustrates the difference between the number of deaths, the crude death rates, and age-standardized death rates in Canada from 2007 to 2016 (Shumanty, 2018).

In 2016, there were 267,213 deaths in Canada, and an age-standardized death rate of 7.4 per 1,000 in the population (Shumanty, 2018). The number of deaths in 2016 was the highest on record since the introduction of Vital Statistics in the 1920s. This increase is due to growth in the general population and an increasingly older demographic. However, the age-standardized death rate declined from 2007 to 2016 from 9.5 per 1,000 to 7.4 per 1,000 (Shumanty, 2018). Thus, when death rates are calculated to eliminate the impact of the population structure, actual rates of death are seen to have gone down.

Figure 13.3 illustrates age differences in the five leading causes of death in 2013. Among adults 65 years of age and older, the vast majority of deaths were due to cancer, heart disease, and stroke. In contrast, among the two youngest groups, accidents,

FIGURE 13.3

Percentage Distribution for the Five Leading Causes of Death in Canada, 2013



Vital Statistics - Death Database, CANSIM Table 102-0561.

Source: Statistics Canada. (2017h). *Health fact sheets: The 10 leading causes of death, 2013*. (Catalogue 82-625X). Ottawa, ON: Author. Retrieved from https://www150.statcan.gc.ca/n1/pub/82-625-x/2017001/article/14776-eng.htm

suicides, and cancer are the leading causes of death (Statistics Canada, 2017h).

Remember that the actual numbers of deaths are lower for progressively younger age groups. So when you hear that "heart disease" is a major cause of death in Canada, you can see that the majority of these deaths occur in people 45 and older. From a public health perspective, younger adults need to prevent the development of heart disease and cancer, but to avoid an early death, they need to prevent accidental injuries.

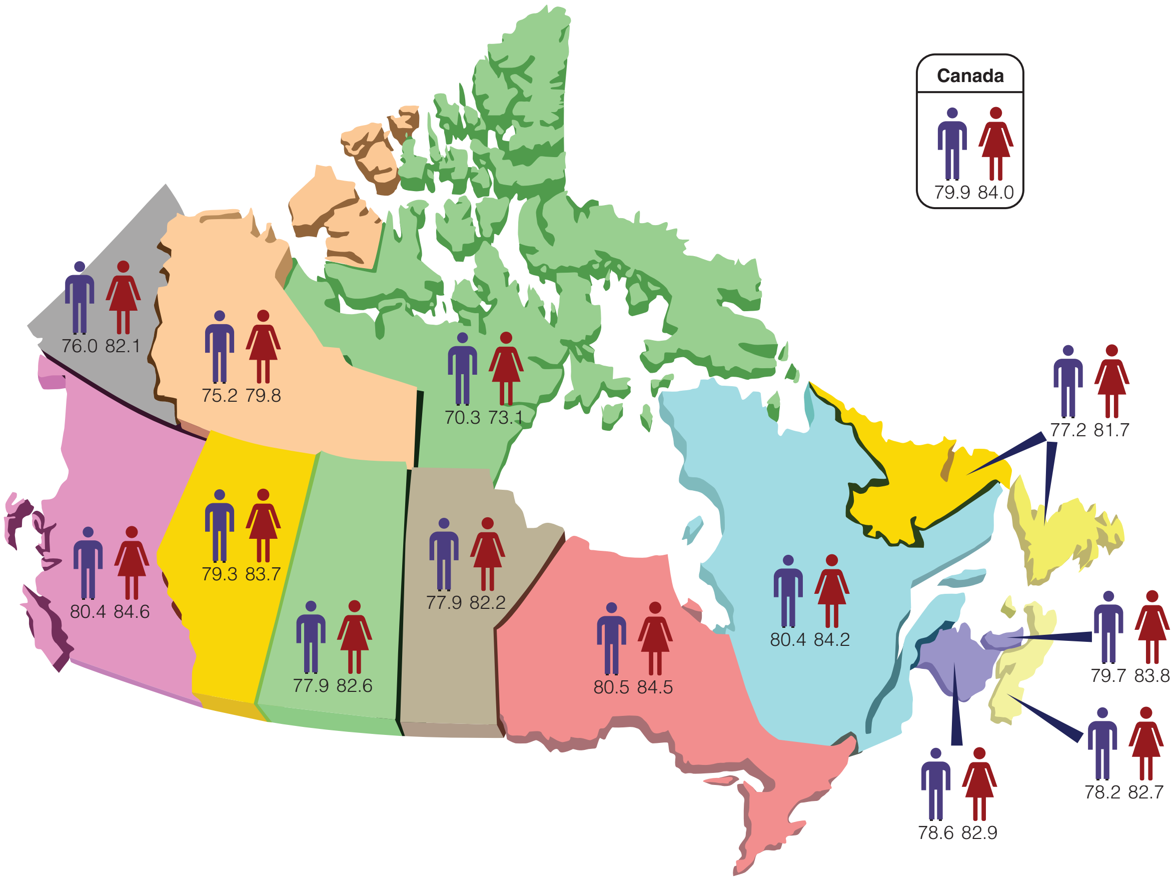
There are, however, large disparities within segments of the population in death rates. In response to the Truth and Reconciliation Commission of Canada, indices of well-being, including death rates, are being better tracked in order to address significant disparities between First Nations peoples and the general Canadian population. In a comprehensive evaluation of data from Indigenous and Northern Affairs Canada, Akee and Feir (2019) reported that, between the ages of 5 and 65, the age-standardized death rates were 226 deaths per 100,000 for Status First Nations men compared to 161 deaths per 100,000 for the general male population. Comparable data were reported for women at 165 and 101 deaths per 100,000 for Status First Nations females and the general female population, respectively. These death rates are much higher for those living on-reserve versus off-reserve, in part due to the poor quality of health care services on reserves.

Another way to look at mortality patterns is to compare life expectancy, which, as you will recall, is the average number of years of life remaining to people born within a similar time period. Currently, the Canadian life expectancy for men is 79.9 years and for women is 84 years (Statistics Canada, 2019a). As you can see from Figure 13.4, life expectancy varies across Canada, with lower life expectancies in the territories (Shumanty, 2018). As indicated above, this is due to disadvantage across many social determinants of health among First Nations, Métis, and Inuit groups.

There are other important demographic characteristics related to longevity. Data from the Pan-Canadian Health Inequalities Reporting Initiative indicated that those living in the lowest-income neighbourhoods had a life expectancy of 79.1 years, 4.1 years less than those living in high-income neighbourhoods (Pan-Canadian Public Health Network, Public Health Agency of Canada, 2018). Similarly, those living in areas with the highest proportion of residents with less than a high school education had a life expectancy of 79.9 years, or 3.1 years less than those living in areas with the highest proportion of university-educated people. In addition, people who have

FIGURE 13.4

Life Expectancy at Birth by Sex, Canada, Provinces and Territories, 2014/2016



Notes: The number of deaths in Ontario for 2016 is considered preliminary, Data used was the most recent available at time of dissemination.

Life expectancy varies across provinces and territories.

Source: Shumanty, R. (2018). *Report on the demographic situation in Canada. Mortality: Overview, 2014 to 2016*. (Catalogue no. 91-209-X). Ottawa, ON: Statistics Canada. Retrieved from https://www150.statcan.gc.ca/n1/pub/91-209-x/2018001/article/54957-eng.htm

ever been married have a lower mortality rate than those who never married, even taking into account the higher mortality of those who are widowed and divorced. The advantage holds for both men and women across all age groups of adults aged 15 and older (Heron et al., 2009).

Figure 13.5 presents facts about worldwide mortality rates (United Nations, 2019). Due to poorer quality information in age group variations in death rates, these data are presented in terms of crude mortality rates (per 1,000 in the country's population). Overall, mortality rates were higher in the less developed regions of the world, reflecting higher mortality at lower ages in countries with a high incidence of communicable diseases and less access to health care. Among the top five countries in mortality rates are several from Central and Eastern Europe, which are characterized by unhealthy diets. Central African Republic's high mortality rate is due to high rates of infectious and parasitic disease (Green, 2012).

The low mortality rates in the Middle Eastern countries shown in Figure 13.5 reflect an influx of healthy migrants (Chaabna et al., 2018). The low mortality rates in the Maldives appears to be due, instead, to a lowering in maternal mortality rates, reflecting a concerted effort by the government to improve health care to expectant mothers (United Nations Population Fund, 2016).

Mortality statistics show how the numbers differ according to key demographic factors. However, the numbers only tell part of the story. Researchers are interested in determining how mortality patterns also reflect the psychosocial factors represented in indicators such as education, marital status, and geography that can influence longevity. These factors are summarized in Figure 13.6.

Beginning with education, as you learned earlier, mortality rates are lower for people with a college education. The health habits associated with educational level account, at least in part, for this effect. A 30-year retrospective study conducted on nearly 180,000 individuals ages 20 to 65 identified alcohol consumption and smoking as the two key factors that contributed to higher death rates among the less educated (Doniec et al., 2019).

Related to education, but distinct in its effect on mortality, is occupational status. Whitehall II established some years

World Crude Rates (per 1,000)

Development status	
More developed	7.2
Less developed	10.1

Top 5 countries	
Bulgaria	15.1
Ukraine	14.9
Latvia	14.7
Central African Republic	14.0
Lithuania	13.9

Lowest 5 Countries	
Qatar	1.5
Bahrain	2.3
Oman	2.6
Kuwait	2.7
Maldives	3.4

FIGURE 13.5

Key Facts About Mortality Statistics

Demographic factors as they relate to death rates in the world.

FIGURE 13.6

Summary of Mortality Predictors

Education	Occupational status	Political economy
Air pollution	Loneliness	Religious involvement
Moderate exercise	Chronotype	Hip fracture

Top psychosocial factors related to mortality.

ago that men and women in lower socioeconomic positions died at younger ages than did their counterparts from higher status occupations. At least some of this differential reflected differences in eating habits and smoking (Marmot et al., 2008) as well as obesity (Hart et al., 2011).

Further support for the role of occupational status as a contributor to mortality independent of education are findings showing that upward mobility in socioeconomic status predicts a lower risk of mortality due to cardiovascular disease (Sung et al., 2019). However, individuals in jobs with higher prestige may suffer health setbacks under certain conditions. A large cross-national study of workers in Japan, South Korea, and eight European countries conducted between 1990 and 2015 supported the overall social class and mortality relationship for Europe. For the two Asian countries, however, the economic downturns of the late 1990s and 2000s took their toll on workers in higher-level managerial and professional positions, who were more likely to die from cancer and suicide (Tanaka et al., 2019a).

The political, economic, and social climates, then, may interact with the individual's own risk factors for higher mortality. An analysis of 58 articles reviewing the available literature on health risks and type of economy showed that the populations in countries with greater support for health care and fewer income inequalities benefited in terms of health and mortality (McCartney et al., 2019).

Health risk factors also contribute to increased mortality due to forces outside the individual's control. One of these is exposure to air pollution. Among a large national cohort of over 635,000 U.S. adults, across subgroups identified on the basis of sex, age, race/ethnicity, social class, and region, the presence of fine particulate matter in the local area predicted early mortality.

The Whitehall II cohort provided some of the first evidence for job status and mortality. More recent analyses suggest that, at least for men, social support becomes an additional factor in the equation. Social network size predicted 27 percent of the relationship between job status and cardiovascular mortality; marital status predicted an additional 25 percent (Stringhini et al., 2012). Older adults who live alone and feel emotionally isolated were found, in the Berlin Aging Study, to have a higher risk of mortality (O'suilleabhain et al., 2019). Thus, perceived lack of social connectedness can also contribute to mortality risk.

Understanding the role of social support in mortality risk can also help explain the longstanding observation that people who are active in organized religion live longer than those who are not. Attendance at religious services appears to be the key protective factor against mortality due to cancer and cardiovascular disease (Li et al., 2016). Social status and lifestyle factors also play a role in affecting this relationship (Wen et al., 2019).

Exercise is known to affect mortality, primarily through its role in protecting against cardiovascular disease. In an innovative study linking steps walked per day to mortality, the "myth of 10,000 steps" was "busted" by showing a mortality benefit, among women, from walking 4,400 daily steps compared to walking only 2,700. For the women in this study, averaging 72 years, a step count of over 7,500 proved no more effective in lowering mortality than 4,400, and rate of walking seemed to make no differences (Abbasi, 2019).

Hip fracture presents another well-known risk to mortality, as it is known to initiate a cycle of institutionalization that can create its own adverse health consequences. However, even before leaving the hospital, 13 percent of hip fracture patients requiring surgery developed a systemic septic (blood) infection that more than doubled the risk of mortality within 30 days of admission (Kjorholt et al., 2019).

Finally, a chronotype in which an individual shows a lifetime of being an "evening person" seems to contribute to mortality in later life, as shown in a 35-year longitudinal study of over 6,000 British adults. People with the evening chronotype tend to engage in unhealthier habits, such as exercising less, eating later, smoking more, and drinking more alcohol than those with the morning chronotype. Even after taking these unhealthier habits into account, those with an evening chronotype had elevated mortality risk (Didikoglu et al., 2019).

Mortality statistics provide valuable insights into patterns of health and well-being in later life. Analyzing the causes of mortality requires taking many related factors into account, and with the availability of more and more longitudinal datasets, and the techniques to analyze them, there should be even more valuable lessons to learn from future studies.

SOCIOCULTURAL PERSPECTIVES ON DEATH AND DYING

According to the sociocultural perspective, people learn the social meaning of death from the language, arts, and death-related rituals of their cultures (see Figure 13.7). A culture's **death ethos**, or prevailing philosophy of death, can be inferred from funeral rituals, treatment of those who are dying, belief in the presence of ghosts, belief in an afterlife, the extent to which death topics are taboo, the language people use to describe death (through euphemisms such as "passed away"), and the representation of death in the arts.

Throughout the course of Western history, cultural meanings and rituals attached to the process of death and to the disposition of dead bodies have gone through remarkable alterations. The ancient Egyptians practised what are perhaps the most well known of all death rituals. They believed that a new, eternal life awaited the dead and that the body had to be preserved through mummification in order to make it the permanent home for the spirit of the deceased. The mummies were buried in elaborate tombs, where they were decorated and surrounded by valued possessions. Family members would visit the tombs to bring offerings of food to sustain the dead in the afterlife. The *Book of the Dead* contained magic spells intended to guide the departed through the underworld and into the afterlife.

Mummification was practised in many cultures, including South America, where the Incas were known to have preserved their dead until as recently as 500 years ago. People can still request that their bodies be mummified today, with services provided by a firm in Salt Lake City for a cost of $35,000 to $60,000 (Dickinson, 2012).

Cultural views within Western society towards death and the dead have undergone many shifts between ancient times and the present (Ariès, 1974, 1981). Throughout the Middle Ages, the prevailing view was of **tamed death**, in which death was viewed as familiar and simple, a transition to eternal life. Death and dying were events that involved the entire community, supported by specific prayers and practices that "tamed" the unknown.

Over the next several centuries, this view of death as a natural process began to be replaced in a cultural shift to a view of death as the end of the self, something to be feared and kept at a distance. For a period in the 1800s, death and dying became glorified, and it was considered noble to die for a cause (the "beautiful death"). Gradually, Western attitudes shifted once again into what we now experience, what Ariès called **invisible death**, the preference that the dying retreat from the family and spend their final days confined in a hospital setting. These attitudes became translated into **social death**, the process through which the dying become treated as non-persons by family or health care workers as they are left to spend their final months or years in the hospital or nursing home.

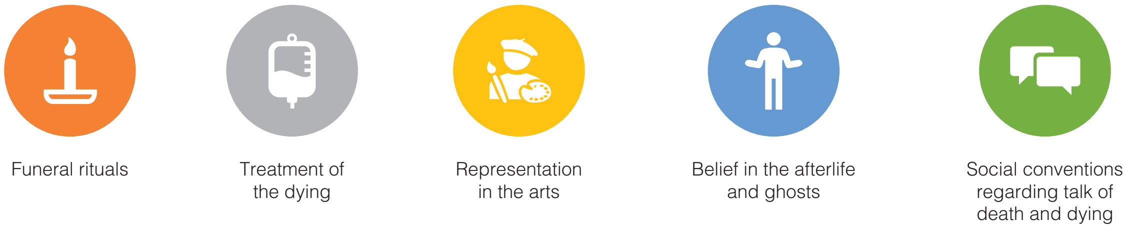
As death has become removed from the everyday world, it has acquired more fear and mystery. Instead of developing our own personal meanings, we are at the mercy of the many images of death that we see in the media. News sources expose us to stories of death from the massive scale of natural disasters to school shootings and terrorist attacks. The death of one famous person may preoccupy the media for weeks, as was the case in the deaths of such celebrities as Princess Diana, John F. Kennedy, Jr., Michael Jackson, and Prince. Some of the most popular movies and television shows focus exclusively on homicide, often taking us step by step through the grisliest of tales involving serial killers and the work of forensic scientists.

Amid the growing institutionalization of death and the attempts by the medical establishment to prolong life, a small book published in 1969 was to permanently alter Western attitudes towards, and treatment of, the dying. This book, *On Death and Dying* by Elisabeth Kübler-Ross (1969), described five **stages of dying** considered to occur universally among terminally ill patients: denial, anger, bargaining, depression, and acceptance.

Rather than being discrete step-like stages, as is often portrayed in the lay literature, the five stages of dying may be more accurately regarded as points along a progression (see Figure 13.8). Indeed, the "change curve" as shown here is now used in a variety of contexts outside of the death and dying literature, such as in helping individuals cope with change more generally. If you think about the last change you had to endure, such as being let go from a job, it is possible that you can relate to your own progression until you finally had no choice but to accept the firing and move on. Unfortunately, the

FIGURE 13.7

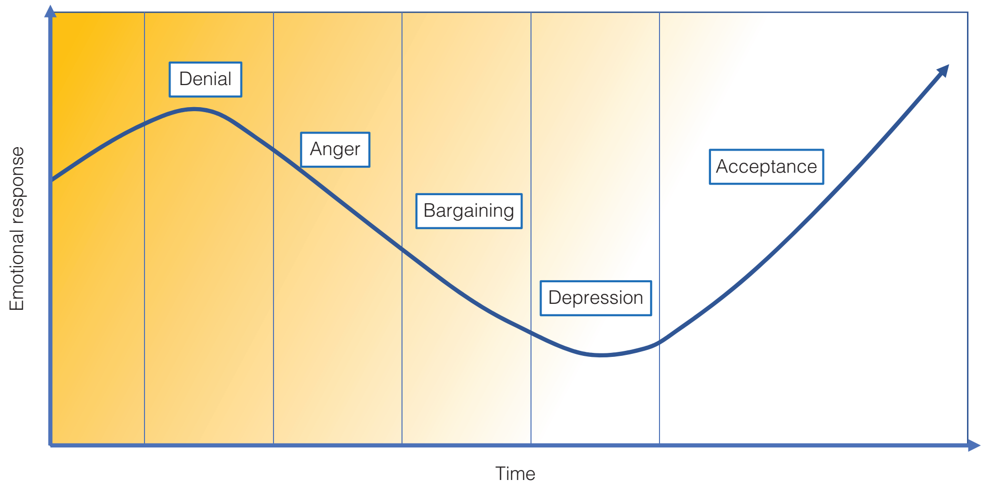
Components of a Society's Death Ethos


Funeral rituals
Treatment of the dying
Representation in the arts
Belief in the afterlife and ghosts
Social conventions regarding talk of death and dying

These are the key indicators of a society's death ethos.

FIGURE 13.8

Kübler-Ross Change/Five Stages/Curve



Stages in the Kübler-Ross model of death and dying shown as a curve instead of discrete steps.

original views of Kübler-Ross became distorted as the book's popularity grew. The five stages began to be interrupted as a series of steps that must be followed by each dying patient. If a patient refused to engage in "bargaining," for instance, then it must mean something was wrong with the way that person was handling the terminal illness. The Kübler-Ross formulation also ignores other emotions that dying individuals may experience, such as curiosity, hope, relief, and apathy.

The critical point that Kübler-Ross attempted to make in her writing was that to reach acceptance of a fatal illness, the dying person must be allowed to talk openly with family members and health care workers. Rather than hide the diagnosis or pretend that everything will be all right, those who interact with the dying person need to give him or her a chance to express the many emotions that surface, ranging from fury to dejection. Along with the work of cultural anthropologist Ernest Becker, whose book *The Denial of Death* (1973) drew attention to Western culture's unwillingness to face the reality of mortality, these writings set the stage for a major shift in cultural attitudes and medical practice for the dying.

Most importantly, the idea of **death with dignity** proposed that the period of dying should not subject the individual to extreme physical dependency or loss of control of bodily functions (Humphrey, 1991). This idea now lies behind efforts in the medical community for dying patients and their families to bring death back into the home. Similarly, patients are being offered the opportunity for a **good death**, in which they can have autonomy in making decisions about the type, site, and duration of care they receive at the end of life (Carr, 2012).

The shifts away from invisible death in the mid-20th century to more contemporary approaches allow dying patients to receive support in the final stages of a terminal illness. Patients and their loved ones are increasingly finding ways to make death once again a more natural way to bring those lives to a humane ending.

PSYCHOLOGICAL PERSPECTIVES ON DEATH AND DYING

From a psychological standpoint, death and dying carry many layers of meaning. Towards the end of their lives, individuals may begin to shift their identity to incorporate the reality that faces them. As with changes they experience throughout life, people can use identity assimilation to minimize, if not deny, as much as possible this coming reality. At some point, however, they must adjust to the fact that their life will be ending, at which point the process of identity balance may start to allow them to face this fact with equanimity. Indeed, these shifts in identity as the individual adapts to the reality of death fit well with the Kübler-Ross change curve, which also begins with denial and ends with acceptance.

The way that people die can also come to define their identities in ways that no other life changes can. Think about the way your views changed about one of those celebrities whose life came to a premature ending. Your memory of them is forever altered by the timing, if not cause, of their death. That same process can apply to the way you think about the death of people who were close to you. Similarly, the ending of your life will alter your identity in the way that close ones will remember you.

When you reach the point of thinking about your own life's ending, you may wish to take steps to leave a legacy that will continue to define you after you are gone, a process called **legitimization of biography**. Through this process, people attempt to see what they have done as having meaning, and they prepare the "story" of their lives by which they will be remembered in the minds of others (Marshall, 1980). Some individuals may put their memoirs in writing, and others achieve an internal reckoning in which they evaluate their contributions as well as their shortcomings.

Psychologically, the dying process can begin well before the individual is in any real physical jeopardy. People first start to think about their own mortality when they reach the point called **awareness of finitude**, which is when they pass the age when other people close to them died (Marshall, 1980). For example, if a man's father died at the age of 66, a kind of counting-down process begins when the son reaches that age. He anticipates the end of life and understands that life really will end.

The notion that the awareness of life's end triggers an intense period of self-evaluation is also an important component of Erikson's concept of ego integrity, as we discussed in Chapter 8. Erikson emphasized that during this period of life, individuals deal with mortality and questions related to the end of their existence by attempting to place their lives into perspective. Presumably, this process may occur at any age, as the dying individual attempts to achieve a peaceful resolution with past mistakes and events that can no longer be made up for or changed.

Terror management theory also proposes that when people's thoughts of death are activated, either consciously or unconsciously, they can experience a wide range of beneficial effects. They may adopt better health habits, be more focused on intrinsic rather than extrinsic goals, show more compassion, and be more motivated to have close interpersonal relationships. People may even be more creative, less likely to hold stereotypes, and feel greater attachment to their community. On the other hand, the "terror" part of terror management suggests that heightened awareness of death can come at a price. Awareness of mortality can be beneficial to people who are able to cope with stressful situations (Kelley & Schmeichel, 2015). Others who lack this ability may experience greater levels of anxiety and lower well-being (Juhl & Routledge, 2016).

ISSUES IN END-OF-LIFE CARE

Improvements in medical technology, along with changes in attitudes towards death and dying, lead health care providers to become far more sensitive to the emotional and physical needs of dying patients. At the same time, legislation and social movements that advocate for the rights of dying patients are making progress in allowing them to preserve their dignity and autonomy.

Advance Directives

Individuals can and should document their wishes in the event that they become ill or incapacitated and are unable to communicate their wishes. A person can express their wishes in a document known as an **advance directive**. This document describes your preferences for future care if you are unable to speak for yourself. Advance directives are useful in ensuring that patients play an active role in deciding on their treatment and it respects their wishes for dignity and autonomy. Advance directives also facilitate communication among patients, health care staff, and families; protect an individual's resources; alleviate anxiety; and reduce the chances of the patient being treated against their wishes. Fortunately, there is an excellent Canadian resource called "Speak Up Canada" that has extensive resources about advance care planning with specific information for different provinces and territories. Included on the Speak Up Canada website are step-by-step instructions on how to complete an advance care plan and how to initiate conversations about advance care planning with family members.

Advance directives may also specify whether cardiopulmonary resuscitation should be attempted and what types of interventions should be used. These range from comfort measures and symptom management, to intravenous hydration and nutrition, to more invasive measures such as intubation and ventilation. A **Do Not Resuscitate (DNR) order** directs health care workers not to use resuscitation if the patient experiences cardiac or pulmonary arrest. **Overtreatment** occurs when patients with DNRs receive active life support that includes resuscitation and do not have their DNR orders respected.

Nursing home residents may also complete a DNH, or do not hospitalize order. Those who do so are less likely to be hospitalized or to die in the hospital, but nevertheless hospitalization may occur regardless of their wishes (Tanuseputro et al., 2019). Hospital patients themselves do not consistently receive the opportunity to complete an advance directive, although standard forms indicating a patient's wishes can improve rates of implementing DNRs (Kohen & Nair, 2019). Nevertheless, 8 out of 10 Canadians have never heard of advance care planning and only 50 percent have had a discussion with a family member or friend about their end-of-life wishes (Speak Up Canada, 2020).

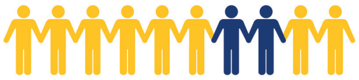
Medical Assistance in Dying

Perhaps the most significant development in end-of-life care in your lifetime has been the legislation permitting Canadian adults who meet the eligibility criteria to request **medical assistance in dying** (MAiD). MAiD can occur in two ways. In the first, a physician (or nurse practitioner) directly administers a drug that intentionally causes death. This was previously referred to as voluntary euthanasia. In the second, a physician or nurse practitioner prescribes a drug that the eligible person takes themselves to end their life. This was previously known as assisted suicide. Note that legislation around who can provide MAiD is constantly changing, and, currently, nurse practitioners are permitted to perform MAiD in some Canadian jurisdictions but not others.

MAiD became legal in Canada on June 16, 2016. To provide you with some historical perspective, a landmark Canadian case involved Sue Rodriguez, a 42-year-old woman who, in 1992, was diagnosed with amyotrophic lateral sclerosis (ALS or Lou Gehrig's disease). She was told that she had less than a year to live and that the quality of her life would be poor; thus, she requested a physician-assisted death. Ms. Rodriguez maintained that section 241(b) of the Criminal Code of Canada prohibiting assisted suicide violated her right to "life, liberty, and security of the person." Her desire was to control the method, timing, and circumstances of her death. She applied to the Supreme Court of British Columbia challenging the validity of section

Did You Know?

100% of Canadians will die



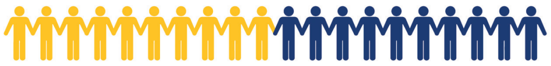
8 out of 10 Canadians have never heard of Advance Care Planning

Advance Care Planning is a process of reflecting on and communicating your wishes for end of life care with your family, friends and health team

Only about half of Canadians have had a discussion with a family member or friend about what they would want or not want if they were ill and unable to communicate

That means 50% of their families

don't know their loved one's wishes — and may have some very difficult decisions to make



Make your wishes known today

Speak Up
Start the conversation about end-of-life care

www.advancecareplanning.ca

Thank you to our project funders:
Canadian Partnership Against Cancer / Partenariat canadien contre le cancer
The GlaxoSmithKline Foundation

241(b) based on the Canadian Charter of Rights and Freedoms. In Rodriguez v. British Columbia (Attorney General) (1993), her application was dismissed. She went on to appeal to the Supreme Court of Canada, but her appeal was denied in a five-to-four decision. With the help of an unnamed physician, she took her own life on February 12, 1994, in her home in Victoria, British Columbia. The only other person present was her friend Svend Robinson, a New Democratic Party member of Parliament and long-time euthanasia activist.

A second landmark case, Carter v. Canada (Attorney General), involved four plaintiffs: Gloria Taylor, Dr. William Shoichet, Lee Carter, and Hollis Johnson. Like Sue Rodriguez, Gloria Taylor was diagnosed with ALS in 2009 and was told she would suffer from paralysis and would likely die within the year. In 2012, and with support from the British Columbia Civil Liberties Association, Gloria decided to challenge the law on assisted suicide. She was joined by Dr. Shoichet, a physician who was willing to perform an assisted suicide if permitted by law. The other plaintiffs, Lee Carter and Hollis Johnson, were the daughter and son-in-law of Kay Carter, an 89-year-old nursing home resident with spinal stenosis, a terminal and painful condition that greatly diminished her quality of life, confined her to a wheelchair and made her unable to feed or toilet herself without assistance. In 2010, her daughter and

Sue Rodriguez.

son-in-law accompanied her to Zurich Switzerland to obtain an assisted suicide (where it is legal), in spite of the fact that they could have been prosecuted for their actions. Carter v. Canada challenged the decision in Rodriguez v. Canada, again on the grounds that it violated the Canadian Charter of Rights and Freedoms. On February 6, 2015, the Supreme Court of Canada found in the plaintiff's favour and supported Gloria Taylor's right to assisted suicide. This led to the passage of Bill C-14 on June 16, 2016, the law that made MAiD legal in Canada.

Sylvia Buchholz/REUTERS/Alamy Stock Photo

Gloria Taylor.

A number of criteria must be met in order to have MAiD, including: 1) eligibility for government-funded health insurance in Canada; 2) 18 years of age or older; 3) have a grievous and irremediable condition, as defined by Section 241.2, para. 2 of the Criminal Code; 4) have made a voluntary request that was not made due to external pressure; and 5) provide informed consent for MAiD after having been informed of all options, including palliative care. Although these criteria may seem clear, in practice it is sometimes difficult to determine whether conditions are "grievous and irremediable." As defined by Bill C-14, in order to be grievous and irremediable, persons must have a serious and incurable illness, disease, or disability that is in an advanced state; they must be enduring physical and psychological suffering that is intolerable to them; and their natural death must be reasonably foreseeable. In addition to the eligibility criteria, the MAiD legislation outlines safeguards physicians and nurse practitioners must follow (Government of Canada, 2020). This is important as there have been concerns about performing MAiD with vulnerable groups, such as those with major neurocognitive impairment (i.e., dementia), mental illness, and disability (The Expert Panel on Medical Assistance in Dying, 2018).

There has been a consistent growth in the number of MAiD deaths since the legislation was enacted in June of 2016. As of February 2020, the number of MAiD deaths in Canada exceeded 13,000, with cancer being the most frequently indicated underlying medical condition, followed by neurological conditions and cardiovascular or respiratory conditions (Department of Justice Canada, 2020a).

The Canadian legislation on MAiD is constantly evolving and changing. Currently, several changes to MAiD legislation are on the horizon and may, in fact, become part of the legislation by the time you read this textbook. The Council of Canadian Academies (2018) assembled 43 experts, across a variety of disciplines from Canada and abroad, to examine the evidence for MAiD among three groups: 1) mature minors, 2) those who want to make an advance request because their condition (e.g., major neurocognitive impairment) will limit their future decision-making ability, and 3) those who have a mental disorder as their sole underlying medical condition. The three comprehensive reports that were generated illustrate the complexity of providing MAiD for each of these groups. For example, there is no universally accepted definition of a mature minor. For those seeking an advance request, when should that be allowed—before diagnosis, after diagnosis but before the onset of suffering, or based on some other criteria? Or, what is the impact of a mental illness on a person's legal capacity to request and consent to MAiD? These are just three of the many questions that illustrate the complex issues that need to be considered in changes to the MAiD legislation. In 2018, the Canadian Psychological Association published the results of a task force that examined MAiD and end-of-life care. The task force provided recommendations that could further inform Canadian legislation pertaining to eligibility for MAiD among mature minors, consent, and those with a mental disorder in the absence of a concurrent physical illness or disability.

It is important to recognize that the MAiD legislation has implications for care providers and health professionals as well. In their scoping review of 33 articles, Fujioka et al. (2018) explored the roles that care providers assume and their greatest challenges. Data from a variety of care providers (e.g., physicians, nurses, mental health providers) indicated that 67 percent provided consultation and support to patients, often communicating end-of-life options and providing additional information about MAiD for those interested in this option. Nurses were often the first point of contact and were highly involved, along with physicians, throughout the MAiD process from early consultation to death. Mental health providers were often called upon when patients had mental health problems or needed additional support in end-of-life decision-making. Similarly, 67 percent of care providers provided consultation and support to other care providers. Other roles included administering lethal drugs, assessing eligibility (including capacity to consent), reporting the assisted death either on a death certificate or by following mandatory reporting procedures, and regulatory oversight to ensure compliance with MAiD legislation.

In terms of the challenges, 76 percent of the respondents indicated ambiguity in professional roles, particularly for nurses who reported that they did not know the practice, scope, and legal limits within their profession. For example, studies from the Netherlands indicated that nurses gave lethal injections in spite of the fact that, legally, this is part of the physician's role. Canadian physicians have reported that administrative or institutional barriers were the most significant source of stress (McKee & Sellick, 2018). Other challenges included lack of interprofessional collaboration, for example, physicians not consulting adequately with nurses in decision-making, ensuring that the appropriate safeguards are in place (e.g., no coercion), and evaluating eligibility, capacity, and consent. As indicated, terms such as "irremediable" in the MAiD criteria are difficult to operationally define, and competency evaluations are not always straightforward. Perhaps most distressing are those situations where providers conscientiously object to MAiD, yet feel pressure to provide it in spite of their ethical or moral views (Fujioka et al., 2018).

Another scoping review conducted by Brooks (2019) emphasized that MAiD is a complex and dynamic process. Providers emphasized the importance of their relationships with patients, including continuous consultation and conversation. Consistency in patients' commitment to MAiD over time gave providers greater confidence in their decision to be involved and to honour patients' final wishes. Due to the complex nature of MAiD decision-making, good communication with patients about the process was identified as critical as was strong collaborative relationships among care providers. Both physicians and nurses have reported intense, complex, and mixed emotional reactions as they seek to provide what is best for their patients, highlighting their need for self-care, emotional support, and time to mourn and cope with their sense of loss (Brooks, 2019).

Hospice Palliative Care

The provision of holistic, person-centred end-of-life care is the domain of **hospice palliative care.** This care may be provided in the home or at a hospice site or program that provides medical and supportive services for patients, beginning when the patient no longer wishes to receive active disease treatment. Within the hospice environment, dying patients are attended to with regard to their needs for physical comfort and psychological and social support and are given the opportunity to express their spiritual needs and have them met. Physicians supervise the care of patients, working closely with spiritual and bereavement counsellors. Hospice services fit closely with expressed patients' needs for obtaining adequate pain control and symptom management, avoiding an extended period of dying, achieving a sense of personal control, relieving the burden they place on others, and strengthening ties with those who are close to them.

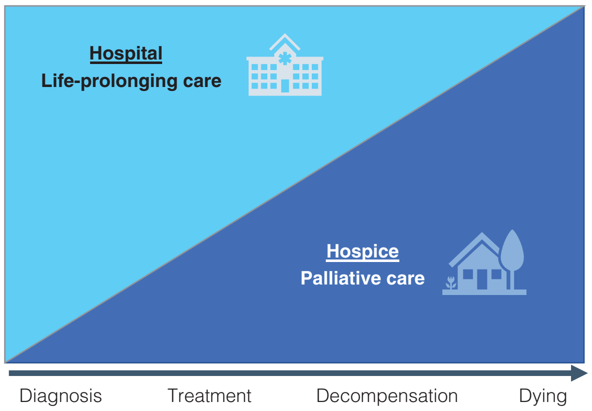
A joint statement by the Canadian Hospice Palliative Care Association (CHPCA) and the Canadian Society of Palliative Care Physicians (CSPCP) emphasize that hospice palliative care and MAiD are not the same, indicating that health care articles and the media conflate and misrepresent the two. To quote, "MAiD is not part of hospice palliative care; it is not an 'extension' of palliative care, nor is it one of the tools 'in the palliative care basket'" (CHPCA & CSPCP, 2019, p. 1). As described, these two processes are different in philosophy, intention, and approach. Unfortunately, fewer than 30 percent of Canadians have access to good quality hospice palliative care while a vast majority, more than 90 percent, would benefit from it. In addition, while MAiD is considered a right in the Canadian Health Act, hospice palliative care is not (CHPCA & CSPCP, 2019). Clearly, legislative support for both options would help dying patients and their family members choose the best option for their needs and wishes.

Figure 13.9 illustrates a model showing how hospice care falls in the continuum of an individual's illness timeline. At the beginning of the illness, the patient is treated entirely with active care in a hospital. As the illness progresses, the ratio of palliative to active care increases steadily until, by the end, the patient receives palliative care only.

The first well-known hospice was St. Christopher's in London, England, which opened in 1967. The hospice movement spread to Canada in the early 1970s. Dr. Balfour Mount was so impressed by a visit to St. Christopher's that he began one of the first hospice care programs at the Royal Victoria Hospital in Montreal. His vision was to integrate hospice units within hospitals. Today, the Canadian Hospice Palliative Care Association is a leader in advocating for access to hospice palliative care in Canada. An excellent resource for obtaining information and support for advanced illness and palliative care is the Canadian

FIGURE 13.9

Continuum from Hospital to Hospice



Life-prolonging to palliative care can be thought of as occurring on a continuum.

Virtual Hospice. This website provides information for children, adolescents, and adults as well as resources for understanding these topics from diverse cultural and spiritual perspectives.

Improving Health Care and Mental Health Services to Dying Patients

Research on end-of-life care, including studies on the needs of and services preferred by dying patients and their families, now provides the basis for improved training of health care professionals. One of the largest research projects carried out on the effectiveness of advance directives was known as SUPPORT (Study to Understand Prognoses and Preferences for Outcomes and Risks of Treatments) (Lynn et al., 1997). Its authors concluded that the best end-of-life care is adapted to the nature of the patient's needs, rhythms, and situations as these vary over the dying trajectory.

Professional organizations and governments are increasingly incorporating principles of good end-of-life care into their policies and suggested training curricula. In November 2011, the report of the Parliamentary Committee on Palliative and Compassionate Care, *Not to Be Forgotten: Care of Vulnerable Canadians*, provided 11 recommendations for palliative care and support for caregivers, including the re-establishment of the Palliative Care Secretariat to develop a national palliative and end-of-life strategy and to collaborate on national standards, dissemination of research, and coordinated support (Parliamentary Committee on Palliative and Compassionate Care, 2011).

More recently, Health Canada (2018b) published the Framework on Palliative Care in Canada. This document provides a vision for palliative care in Canada with a set of guiding principles to promote high-quality palliative care, with an action plan to achieve short-, medium-, and long-term goals. These include improved palliative care education and support for health care providers and caregivers, better research and data collection on palliative care, and measures to facilitate improved access to palliative care, particularly among underserved groups. Table 13.1 identifies shifts in palliative care policies and programming that need to happen in order to promote high-quality palliative care in Canada.

Many other organizations (e.g., Canadian Cancer Society, Canadian Home Care Association, Alzheimer Society of Canada) have supported the need for coordinated and high-quality care at the end of life, and many reports have been written. These organizations and reports emphasize the need to provide patients with the opportunity to discuss and plan for end-of-life

TABLE 13.1

What Success Looks Like—Shifts in Palliative Care Policies and Programming

LESS OF ...	*MORE OF . . . .*
Palliative care treatment plans are focused primarily on controlling physical symptoms such as pain.	Palliative care is holistic, addressing the physical, psychosocial, spiritual, and practical concerns of the person and their family. An interprofessional team is mobilized, where possible, to support the full range of concerns, as needed.
Palliative care treatment plans are decided by the health care provider(s).	Palliative care is developed in partnership with the person living with life-limiting illness and their family, and respects their values, culture, and preferences.
Palliative care is offered almost exclusively in last weeks of life.	Palliative care at appropriate levels is offered as early as diagnosis of a life-limiting illness.
Palliative care is discussed only after all other medical interventions are exhausted.	Palliative care is provided in conjunction with other medical interventions. Treatment plans are designed to improve quality of life through to the end of life.
Palliative care is only provided by specialists.	All health care providers (regulated or not) have foundational skills to provide a palliative approach to care, supported by specialists as needed.
Palliative care is delivered predominantly in hospitals.	Palliative care is available in the home setting or other setting of choice.
Access to palliative care is uneven across the country both by location and population.	Innovations and technology are used to ensure that palliative care supports and services are available to those who need them, regardless of where they live or their personal characteristics.
Caregivers are on the periphery of the health professional team, but may not be a part of the decision making or care planning.	Caregivers are central to the treatment planning process, respected and consulted as knowledgeable members of the care team, and provided with appropriate training and respite care.
There are no national standards for data collection or use, and few person-centred outcome or experience measures.	Data are standardized or linkable across care settings and providers, and include measures of the outcomes and experiences of persons with life-limiting illness and their families.
There is insufficient support for research specific to palliative care.	There are ongoing and sufficient financial and infrastructure resources to support data systems and research which provide the evidence base for improvements in palliative care.

Health Canada. (2018b). *Framework on palliative care in Canada.* Ottawa: ON: Author. Retrieved from https://www.canada.ca/content/dam/hc-sc/documents/services/health-care-system/reports-publications/palliative-care/framework-palliative-care-canada/framework-palliative-care-canada.pdf

care, assurance that attempts will be made to provide comfort and respect their end-of-life wishes, assurance of dignity, and attention to the individual's goals, as well as the need to minimize the burden on the family and support the bereaved through the stages of mourning and adjustment. In addition, the Canadian Psychological Association has published fact sheets on end-of-life issues, pediatric palliative care, and grief in adults, and the American Psychological Association provides helpful documents pertaining to policy, advocacy, and resources for psychologists.

BEREAVEMENT

Bereavement is the process during which people cope with the death of another person. A process that can affect anyone, regardless of age, bereavement is more likely to take place in later adulthood, when people have an increased risk of losing their spouse, siblings, extended family, friends, colleagues, and neighbours.

Like the processes of death and dying, we can best understand bereavement as a biopsychosocial process. Physiologically, bereavement places stress on the body, leading to physical symptoms such as tightness in the chest, shortness of breath, loss of energy and strength, sleep problems, digestive symptoms, and decreased immune system resistance. As we saw in Chapter 9, these symptoms can be severe enough to increase risk of dying in widowed spouses. Emotionally, bereaved individuals experience a range of feelings, including anger, depression, anxiety, emptiness, and preoccupation with thoughts of the deceased. Cognitive changes can also occur in some bereaved individuals, including impaired attention and memory, a desire to withdraw from social activities, and increased risk of accidents. Socioculturally, the loss of a spouse alters the individual's position in the family and community and status within society and may also place the individual at risk of additional financial burden. Loss of other family members, friends, and neighbours can dramatically change the individual's support network.

Of all forms of bereavement, the loss of a child is perhaps the most devastating, even more so than the loss of a spouse (Maccallum et al., 2015). The grief a parent experiences over a child's death is highly intense and is associated with increased risk of depression, guilt, and health complaints that may last for many years (Rogers et al., 2008). The loss of a child through stillbirth, however, can be associated with stigma, which further exacerbates the bereavement reaction (Pollock et al., 2019).

Moreover, bereaved parents are themselves at higher risk of mortality. A longitudinal study carried out in Sweden showed that mothers of children 18 and under were themselves at greater risk of dying than their non-bereaved counterparts. In this study, although the risk of dying was lower in mothers of children 18 and older, it remained elevated for at least eight years following the child's death (Rostila et al., 2012). An Israeli study on a sample of adults aged 75 to 94 years showed that the effects of parental bereavement can continue for as long as 20 years, even after controlling for age, gender, education, and widowhood status. The effect was more pronounced for mothers than for fathers (Cohen-Mansfield et al, 2013), replicating the findings of the Swedish study.

This woman mourns the loss of her husband after his funeral. Adjustment to widowhood can be a long and difficult process.

Religious teachings can provide comfort for the dying and bereaved through their emphasis on the existence of an afterlife and the belief that human events occur because of some higher purpose. The loss of a loved one, particularly when it occurs "prematurely" (i.e., before old age), may be seen as a test of one's faith. For example, grieving Christian families and friends comfort themselves with the knowledge that they will be reunited in heaven with the deceased, where they will spend eternity together. Another belief in which people may find comfort is that death is a blessed relief from a world of trouble and pain. Bereaved individuals may also seek solace in the belief or perception that they can sense the presence of departed loved ones. As the terminally ill or bereaved attempt to come to grips with the ending of a life, they rely on these beliefs to make sense out of the death or to achieve some kind of understanding of its meaning.

One belief held about people who are engaged in caregiving prior to their loved one's death is that they could benefit from anticipatory grief, in which they begin to work through the loss before it occurs. Although such pre-loss grief work does not seem to reduce the bereavement reaction in caregivers, there are advantages to being prepared for the impending death, both emotionally and in practical terms (Nielsen et al., 2016).

Conventional and professional wisdom regarding bereavement was based on the assumption that the survivor must "work through" the death of the deceased. According to this

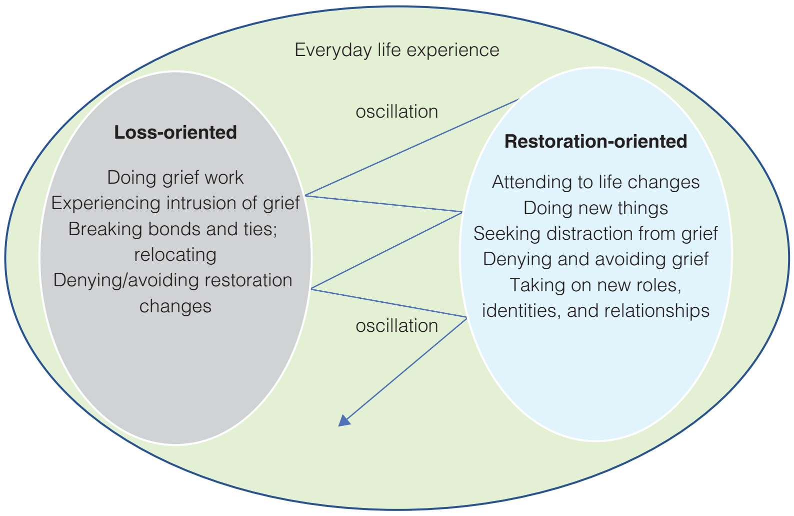

Everyday life experience
oscillation
Loss-oriented
Doing grief work
Experiencing intrusion of grief
Breaking bonds and ties; relocating
Denying/avoiding restoration changes
Restoration-oriented
Attending to life changes
Doing new things
Seeking distraction from grief
Denying and avoiding grief
Taking on new roles, identities, and relationships
oscillation

FIGURE 13.10

Dual-Process Model of Bereavement

The dual process of bereavement proposes that the bereaved alternate between loss-oriented and restoration-oriented functions.

view, the individual must experience a period of mourning, but after that, it is time to move on and seek new relationships and attachments. In part, this view was based on the assumption in psychodynamic theory that to resolve grief normally, emotional bonds with the loved one must be broken.

Researchers and theorists now recognize that the bereaved can benefit from the continuing bond they feel with those they have lost. In the **attachment view of bereavement**, the bereaved can continue to benefit from maintaining emotional bonds to the deceased individual. This means that the survivor can hold on to at least some of the spouse's possessions because of their symbolic value without ever having to dispose of them. Similarly, the bereaved individual can benefit from holding onto thoughts and memories of the deceased (Field et al., 2003). In some ways, the deceased person becomes a part of the survivor's identity.

In the **dual-process model of coping with bereavement**, the practical adaptations to loss are regarded as important to the bereaved person's adjustment as the emotional (Stroebe et al., 2010) (see Figure 13.10). The practical adaptations include the set of life changes that accompany the death, including taking on new tasks or functions, called the "restoration" dimension. The "loss" dimension involves coping with the direct emotional consequences of the death.

One memorable example of restorative coping comes from the main character in the movie *Up*. Carl Fredericksen has lost his beloved wife of many years, Ellie. He is embittered and miserable, though determined to go through on his plans he had with Ellie to visit South America. However, he becomes transformed through his relationship with Russell, a boy scout who literally wanders into his life and helps Carl to learn once more how to experience positive emotions.

According to the dual-process model, people are able to adjust to bereavement by alternating between the two dimensions of coping. At times it is best to confront the emotional loss of the individual; at other times, it is most advantageous to avoid confronting these emotions and instead attempt to manage the practical consequences. People seem to vary in their response to loss, according to this model, on the basis of their attachment style. Securely and insecurely attached individuals show different patterns of mourning and require different types of help to be able to adapt to the loss.

Focusing specifically on personality factors as predictors of reactions to bereavement, Mancini and Bonanno (2009) propose that people who are best able to cope with loss are able to use flexible adaptation—the capacity to shape and adapt behaviour to the demands of the stressful event. At other times, though, it is more beneficial to use "repressive coping," in which the painful event is expunged from conscious awareness. Other personal qualities that can help people cope with significant losses such as widowhood include optimism, the capacity for positive emotions, and the ability to maintain a sense of continuity over time.

The idea that denial may be adaptive, at least for a time, fits well with identity process theory. Let us consider the example of widowhood. Identity assimilation may be a preferable approach during the early days and weeks after the loss of the spouse. Being able to avoid focusing or ruminating on the loss, as in the healthy denial component of assimilation, may allow individuals to remain optimistic and feel a greater sense of personal control. They may also be better able to carry out the restoration dimension of adapting to the practical changes in their living situations, as stated in the dual-process model.

For example, widows who wear their wedding ring and refer to themselves as "Mrs. X" for a time after their husband's death are displaying this type of adaptation. Continuing to identify with their role as wife may help them retain this valued part of their sense of who they are within their families and communities. Over time, through identity accommodation, they may be able to establish greater identity balance by gradually incorporating the notion of themselves as widows into their sense of self.

There are lessons to be learned from the experiences of people as they cope with death, dying, and bereavement. In particular, older adults have a remarkable ability to manage the fear of death, which causes younger people to react with anxiety and efforts at denial. It may be the ability to move ahead without losing the memory of the departed individuals in one's life that long-lived individuals possess and make it possible for them to survive repeated losses in later adulthood. These individuals have developed ways of integrating the pain of multiple losses into their lives and are able to take their lives in positive new directions. In the future, this process may be made that much less painful by the understanding among mental health professionals of the needs of the bereaved to retain rather than abandon the emotional ties of attachment.

SUMMARY

1. Death is defined as the point of irreversible loss of bodily functions, although this state may be difficult to determine as a result of the advent of life-support systems that can keep people alive longer. At the end of life, individuals experience a number of physical changes, many of which are physically uncomfortable, and may involve a great deal of pain. Dying trajectories take into account variations in the dying process.
2. Mortality rates differ according to variables such as ethnicity, geographic variations, marital status, education, and occupation. Additionally, predictors of mortality include education (reflecting better health habits), occupational status, political economy, amount of clean air in the environment, loneliness, religious involvement, amount of exercise, chronotype, and infection following hip fracture.
3. A culture's death ethos is reflected in the traditions it has established in funeral rituals, belief in an afterlife, and the language used to describe death. Western attitudes towards death have undergone major shifts throughout history. Contemporary Canadian attitudes regard death in a sensationalistic way, but the predominant tendency is to institutionalize death and make it "invisible." The death with dignity movement has attempted to promote the idea that the individual should have control over the conditions of death. The work of Kübler-Ross was important in shaping contemporary approaches to care of the dying.
4. Issues in end-of-life care focus on the extent to which dying patients can exert control over their medical care. Individuals can establish advance directives that indicate whether they wish to extend their life through artificial means, prior to needing to make this decision. The SUPPORT study on end-of-life care revealed a number of serious weaknesses in the medical care of dying patients in the United States. Many were in pain, felt that their preference for palliative care was not respected, and did not believe that they had had an adequate opportunity to discuss their preferences with their health care providers. MAiD is legal in Canada and is a complex issue that affects patients, their family members, and the professionals that care for them. Hospice palliative care provides medical and supportive services for dying patients, allowing them to receive personal attention and maintain contact with family. There are also changes in end-of-life care based on employing ways to help patients and their families have their wishes heard.
5. Bereavement is the process of mourning the loss of a close person. In the past, theories of grief resolution focused on the need to "work through" a death. Current views emphasize an alternative in which the bereaved are more accepting of the sad feelings accompanying the loss. The dual-process model of bereavement proposes that both practical (restorative) and emotional (loss) dimensions describe the period of adaptation to the loss of a loved one.

14

Successful Aging

Can you guess what it takes to age successfully? See which of these criteria apply to successful agers and check your answers on the next page:

AGEFEED

test yourself

1. Focus on positive past achievements.
2. Express creativity.
3. Try to look as young as possible.
4. Receive and offer social support.
5. Remain physically active.
6. Avoid believing in stereotypes about aging.
7. Be free of any chronic diseases.
8. Be resilient in the face of challenges.
9. Live in one's own home.
10. Have adequate financial resources.

AGEFEED

test yourself

Now see how well your answers measure up to what the experts say about successful aging. Each of the check marks shows which qualities are found in successful agers:

✓ Focus on positive past achievements.
✓ Express creativity.
Try to look as young as possible.
✓ Receive and offer social support.
✓ Remain physically active.
✓ Avoid believing in stereotypes about aging.
Be free of any chronic diseases.
✓ Be resilient in the face of challenges.
Live in one's own home.
Have adequate financial resources.

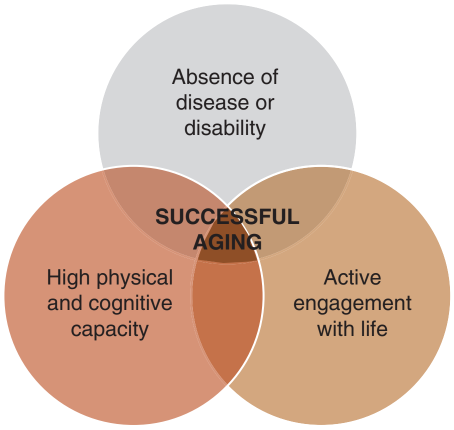
Keep reading the chapter to learn more about successful aging!

Many people assume that at the end of life, people experience a precipitous drop in their well-being and adjustment. However, as you have learned by now, survival into the later years of adulthood requires that individuals can negotiate the many threats presented to living a long life. As we stated at the outset of this book, to get old you have to not die; to age successfully requires additional adaptive qualities. Because older adults have managed to avoid so many threats that could have ended their lives at a younger age, there may be some special quality about older individuals that can account, in part, for their having reached this point in their lives.

In this final chapter, we will explore the topics of psychological growth and creativity in the later adult years. Successful agers not only "survive" but also achieve heightened levels of personal expression and happiness. We hope that these inspirational qualities can guide and sustain your optimism and hope about your own future adult years.

FIGURE 14.1

Rowe and Kahn Model of Successful Aging


Absence of disease or disability
SUCCESSFUL AGING
High physical and cognitive capacity
Active engagement with life

WHAT IS SUCCESSFUL AGING?

As we discussed in Chapter 1, the process of optimal aging refers to age-related changes that improve the individual's functioning. Throughout this book, we have identified many ways in which older adults can maximize their abilities and well-being. Here we will try to pinpoint the factors that coalesce in certain older adults to give them an edge and permit them to hold onto their abilities until the very end of their lives.

An Overview of Successful Aging

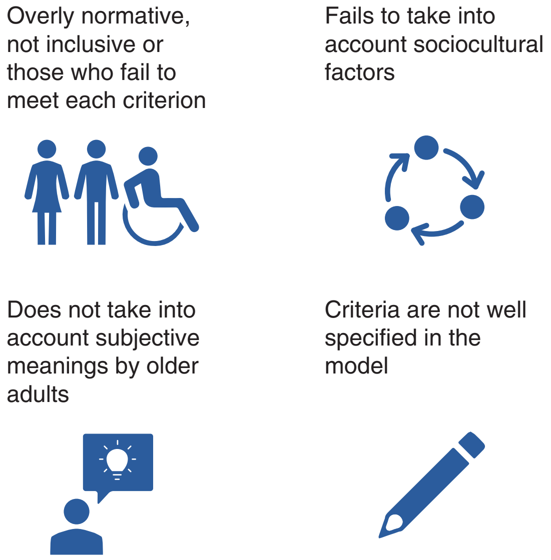
Let us begin by asking you to think of people you would nominate as successful, or optimal, agers. Do you have a grandmother who you have difficulty keeping up with when the two of you go for a walk? Is there a great-uncle in your family who can beat everyone at word games? How about your mother's cousin, who backpacks around the world for three or four weeks a year? Perhaps your 80-year-old neighbour has never worn glasses and can hear better than you can. Now, think about well-known older individuals who became cultural icons. Perhaps you have come up with Betty White, the American television comedian and star of television's legendary sitcom about older women, *Golden Girls*. White skyrocketed to popularity in 2010 when a Facebook-inspired movement led the producers of *Saturday Night Live* to invite the 88-year-old to host the show, a performance that garnered her an Emmy Award. She remains an inspiration to people of all ages, both for her sense of humour and her indefatigable approach to life.

The most widely researched model of optimal aging, proposed by Rowe and Kahn (1998), serves as the theoretical foundation of their work on the MacArthur Foundation Study of Aging in America. As distinct from "usual" aging (i.e., primary), the **Rowe and Kahn definition of successful aging** regards the optimum state to be the absence of disease and disability, high cognitive and physical functioning, and engagement with life. You can see this model of successful aging in Figure 14.1, showing it as the combination of these three contributing factors.

The Rowe and Kahn model of successful aging served to highlight the growth that can occur in later life, but subsequent researchers find it to be incomplete or flawed, as summarized in Figure 14.2 (Martinson & Berridge, 2015). These critiques focus around the common theme that the model is overly "normative," meaning that it excludes the many variations that exist among successful agers who do not meet every single criterion. Those who come from disadvantaged backgrounds, moreover, may not have the ability to achieve all three of these conditions due to stressful early lives or lack of access to health care and other resources in later life. The qualities it takes to be a successful

FIGURE 14.2

Critiques of Rowe and Kahn Model of Successful Aging


Overly normative, not inclusive or those who fail to meet each criterion
Fails to take into account sociocultural factors
Does not take into account subjective meanings by older adults
Criteria are not well specified in the model

Criticisms of the Rowe and Kahn model of successful aging.

ager, furthermore, are not well specified in the model. Finally, the model does not take into account the subjective meanings that older adults themselves have about the extent to which they feel they have aged successfully.

These criticisms make sense; even when you think of the successful agers you have either known or seen in the media, some may very well have one or more age-related limitations. That sprightly grandmother may have a few memory lapses now and then, or perhaps she has had cataract surgery. That backpacking mother's cousin may need to use a cane as she navigates her way around the world. You may also know other individuals who have an age-related physical disability that severely limits their mobility, but whose sense of optimism and hope rivals yours, even on your best days.

The World Health Organization (WHO), in its report on Active Ageing (2002), defined **active aging** as the process of optimizing opportunities for health, participation, and security in order to enhance quality of life as people age (World Health Organization, 2002a). Figure 14.3 shows the WHO model of active aging which, in many ways, is like that of the Bronfenbrenner (1994) ecological perspective in that it specifies a role for social, health care, and economic determinants as well as pointing to the importance of the physical environment. Noteworthy is the fact that the WHO makes explicit the role of autonomy and independence, placing greater emphasis on the individual's ability to get around in the environment, rather than on whether the individual needs physical accommodations due to disability.

Building on the concept of active aging, the World Health Organization subsequently released its World Report on Ageing and Health, noting that a comprehensive public response is needed if older individuals around the globe are able to achieve active aging, or what they now refer to as **active and healthy aging (AHA)** (World Health Organization, 2015). The challenges for this effort are to understand diversity in later life and the fact that "the diversity seen in older age is not random" (p. 8). Ageism further creates policy challenges, because stereotypes about older adults, for example, as draining social and health resources need to be overcome. Finally, social safety nets may be disappearing with changes in the economy as well as in the family.

Combining the WHO definition of active and healthy aging with the original Rowe and Kahn criteria, researchers involved with the Survey of Health, Ageing and Retirement in Europe (SHARE) provided support for expanding the definition of successful aging beyond the original three criteria (Bosch-Farré et al., 2018). The SHARE dataset used to assess active and healthy aging included nearly 53,000 individuals aged 50 and older living in 14 European countries. The Rowe and Kahn criteria were operationalized into measures of no previous diagnosis of a major disease or activities of daily living limitation, high scores on cognitive and physical functioning measures (e.g., memory scores, ability to climb a full set of stairs), and social engagement (e.g., paid work or caring for grandchildren and social support).

The SHARE study then assessed AHA with the additional criteria of physical well-being (frailty and age-adjusted cognitive performance), mental well-being (satisfaction with life and no depressive symptoms) and social well-being, consisting of

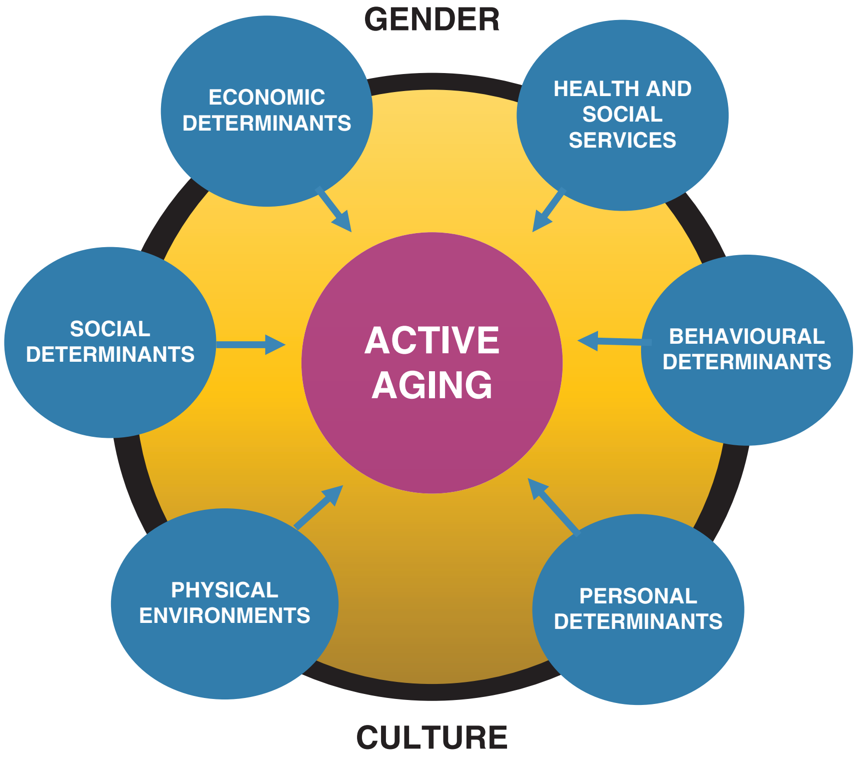


FIGURE 14.3

WHO Model of Active Aging

The WHO model of active aging proposes a wide range of influences that contribute to active, or successful, aging.

satisfaction with social activities (e.g., work, grandparenting, religion, politics), and low scores on a standard measure of loneliness in addition to actual social support. Thus, SHARE provides a broader definition of successful aging than does the original Rowe–Kahn model and also takes the individual's subjective ratings into account.

With this expanded definition, the SHARE findings revealed that although only 19 percent of the sample fit the more restrictive Rowe–Kahn criteria for successful aging, 57 percent met the AHA-based criteria. In other words, 38 percent more SHARE participants fit the definition of successful aging than would have with the original three criteria.

The SHARE findings, then, support the criticisms of the original successful aging model. Furthermore, the methods used to obtain those results are defined in clear enough terms to be applied by other researchers.

Successful Cognitive Aging

A number of investigators are exploring the notion that successful aging in the cognitive sense remains an important topic in its own right. As we have explored in earlier chapters, there are large interindividual differences in cognitive functioning, so we know that some people maintain higher levels of performance than do others. Moreover, an individual's cognitive functioning plays an important role in the ability to adapt to the demands of everyday life, as we saw in Chapter 7. Many older adults, as we have also seen, regard cognitive functioning as central to their identities; this is one reason that they so greatly fear developing Alzheimer's disease and other forms of neurocognitive disorder.

In keeping with this focus, then, **successful cognitive aging** can be defined as cognitive performance that is above the average for an individual's age group as objectively measured (Fiocco & Yaffe, 2010) (Figure 14.4). **Superagers**, in turn, are defined as individuals 80 years and older with episodic memory that is comparable to, or superior than, that of middle-aged adults.

The search for factors that contribute to successful cognitive aging can engage individuals, families, and policy makers in discussions of the factors that promote health, rather than those that focus solely on diagnosis and treatment of neurocognitive disorders (Institute of Medicine; Board on Health Sciences; Policy Committee on the Public Health Dimensions of Cognitive Aging, 2015).

Factors that might contribute to the superior cognitive performance of superagers appear to include cortical thickness (Harrison et al., 2012), greater brain plasticity (Greenwood, 2007), an activated inflammatory response that protects the brain's white matter (Gefen et al., 2019), improved connectivity in the default mode and information filtering networks in the brain (Zhang et al., 2019), faster electrophysiological encoding (Dockree et al., 2015), and a "super-aging" phenotype (Huentelman et al., 2018). Perhaps related to the AHA model, cognitive superagers may also experience more rewarding social relationships (Cook Maher et al., 2017).

Factors That Promote Successful Aging

As we have just seen, people may age successfully even if they have a number of chronic health conditions. Older adults are also less likely to experience serious mental illness, as you learned in Chapter 12.

Interest in successful aging fits more generally within the larger field of **positive psychology**, which seeks to provide a greater understanding of the strengths and virtues that enable individuals and communities to thrive. Within this tradition, **life satisfaction** is the overall assessment of an individual's feelings and attitudes about one's life at a particular point in time. **Subjective well-being** is the individual's overall sense of happiness. These two terms clearly are related; however, somewhat separate research traditions have developed around their use, so it is helpful to treat them as distinct. One difference is that life satisfaction may be more of a cognitive evaluation, but subjective well-being is more affective or emotional. Research on the factors that contribute to successful aging emphasizes both the affective and cognitive components, as shown in Figure 14.5.

One of the great puzzles for researchers who study successful aging is to explain why, as you saw in research from the SHARE study, so many older adults are able to remain positive in their approach to life despite their accumulating chronic health

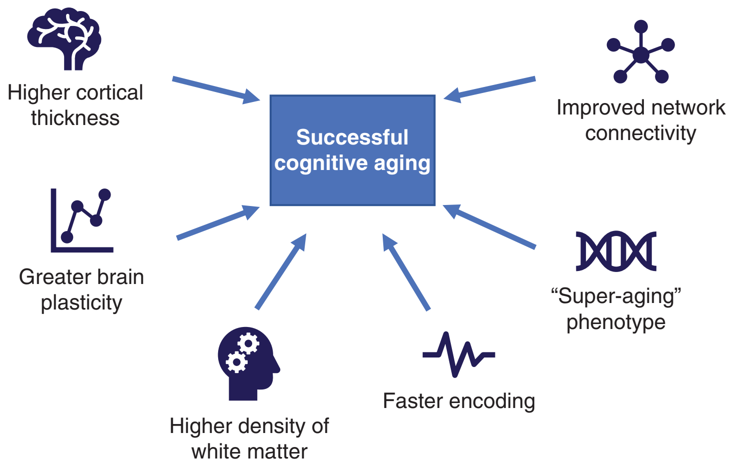

Higher cortical thickness
Successful cognitive aging
Improved network connectivity
Greater brain plasticity
"Super-aging" phenotype
Higher density of white matter
Faster encoding

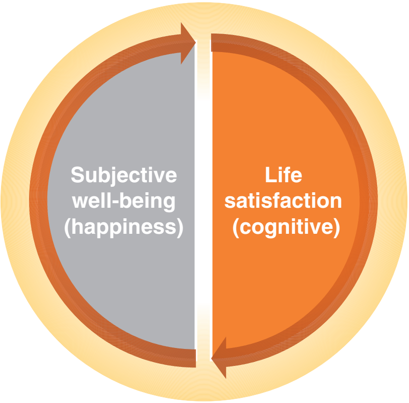
FIGURE 14.4

Successful Cognitive Aging

The components of successful cognitive aging.

FIGURE 14.5

Psychological Components of Successful Aging


Subjective well-being (happiness)
Life satisfaction (cognitive)

Factors that promote successful aging include cognitive and affective components.

conditions, normal age-related changes, and alterations in their social roles and financial security. The **paradox of well-being** refers to the findings from research on successful aging that older adults maintain high subjective well-being despite facing challenges from their objective circumstances.

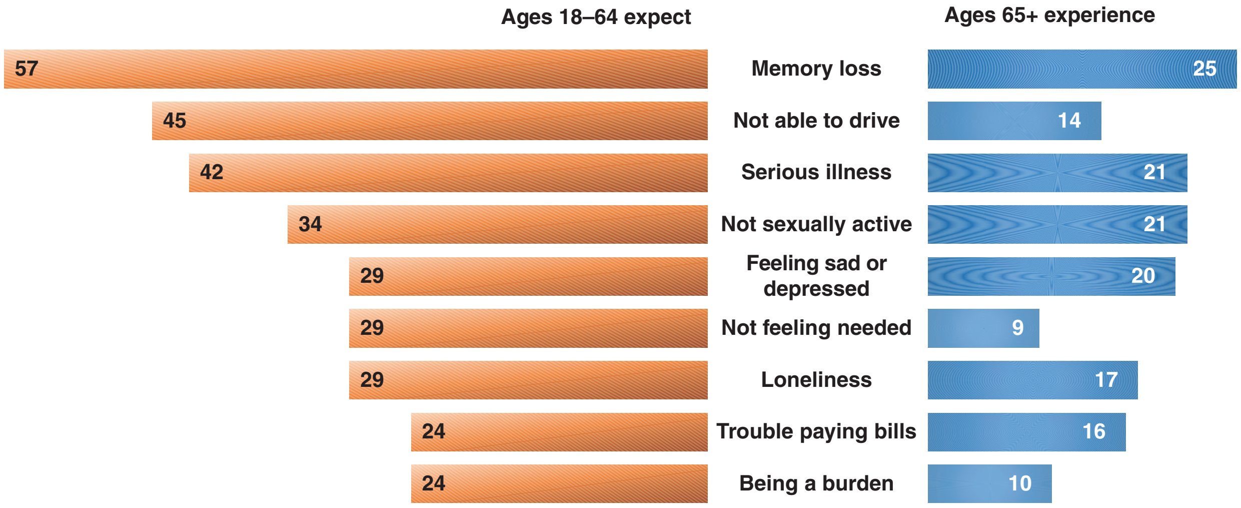
The paradox of well-being exists, at least in part, because it contradicts the belief that well-being is determined by **social indicators**, or objective measures of social and economic welfare. According to the **social indicator model of well-being**, these demographic and social structural variables account for individual differences in levels of well-being. Because by demographic standards older individuals are in a disadvantaged position on these indices, they should therefore be less happy than the young. When an older adult is able to avoid becoming depressed by the potentially disturbing circumstances of poor health, widowhood, and low income, then that person seems deserving of some kind of special recognition.

Where do you stand on the social indicator model as an approach to understanding changes in later life? Do you believe that the changes associated with the aging process should have detrimental effects on the older adult's life satisfaction and subjective well-being? An online survey of 2,500 Canadian adults indicated that 78 percent of people 65 years and older reported being very happy in contrast to 62 percent of those between the ages of 18 to 34. Older Canadians report greater happiness over a variety of domains, including financial status, relationships, physical appearance, and mental and physical health (Johnson, 2018). Moreover, as shown in Figure 14.6, in a survey of almost 3,000 Americans, most older adults rated their own experience of aging more favourably than younger adults would expect, along a variety of dimensions from the extent of memory loss to the feeling of being a burden on others (Pew Research Center, 2009).

The question is whether older adults have developed a set of coping skills over their lifetimes that allow them to frame events that younger adults would consider detrimental to their own well-being or even that the older adults would have found challenging when they themselves were younger. It is also possible that cohort effects lead current generations of older adults to feel higher levels of subjective well-being because they grew up with different expectations about what their lives would be like than is true for current cohorts of young adults. Another possibility is that the paradox of well-being reflects a survival effect and that the older adults who are still alive and available to be tested are hardier and more optimistic than those who are either no longer in the population or unwilling to be sampled. Perhaps these individuals were always inclined to

FIGURE 14.6

Expectation of Aging Versus Experience of Aging Among American Adults



The difference between expectations of aging and reality of aging as shown in a Pew survey of American adults.

Source: Pew Research Center. (2009). *Growing old in America: Expectations vs. reality*. Retrieved from http://pewresearch.org/pubs/1269/aging-survey-expectations-versus-reality. Reproduced with the permission of the Pew Research Center.

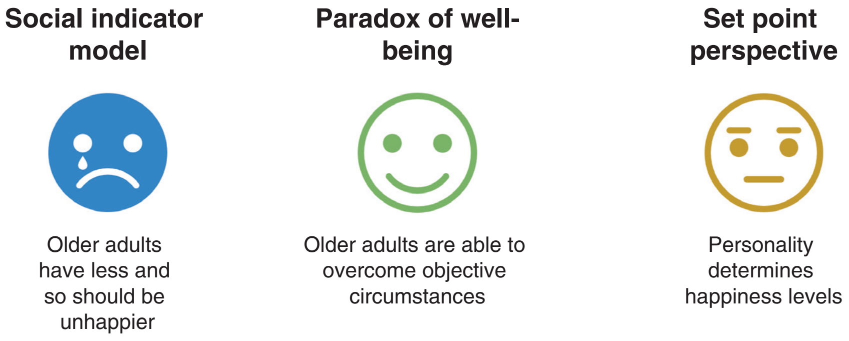

Social indicator model
Paradox of well-being
Set point perspective
Older adults have less and so should be unhappier
Older adults are able to overcome objective circumstances
Personality determines happiness levels

FIGURE 14.7

Models of Subjective Well-Being

Three approaches to explaining subjective well-being in later adulthood.

view the world in a positive way, and the fact that they are the ones left standing at the end of life reflects their particular optimistic bias.

The idea that optimists are the ones that remain alive is consistent with the **set point perspective**, which proposes that people's personalities influence their level of well-being throughout life. However, research on happiness as a predictor of longevity does not support this approach. Data from two large longitudinal panels studied in Germany and Australia showed that unhappy people are more likely to die relatively early in life, perhaps because they are more likely to engage in risky behaviour. Beyond that point, there appeared to be no relationship between longevity and subjective well-being (Headey & Yong, 2019).

Figure 14.7 summarizes the three contrasting models of subjective well-being and aging. The paradox of well-being model, as you have just seen, appears to provide a better explanation of the phenomenon of successful aging than either the social indicator or set point perspective models.

These three models suggest, then, that the way individuals perceive their circumstances in later life appears more important than the objective circumstances in which they live or even their levels of personal optimism. The WHO model of AHA suggests, though, that sociocultural factors must also be taken into account. It becomes more difficult to maintain that positive perception of life when aging takes place against the backdrop of negative stereotypes towards, and discrimination against, older adults.

These challenges towards successful aging are being addressed by the WHO (2015), in conjunction with the United Nations Sustainable Development Goals (2015) to ensure healthy lives and promote well-being for all at all ages. The concept of the **age-friendly environment**, as defined by the WHO, enables people of all ages to participate in their communities, treats everyone with respect, regardless of age, makes it easy for older people to maintain their social connections, and helps people maintain their health and activity even at the oldest ages (see Figure 14.8).

In practical terms, an age-friendly environment, according to the WHO, is free of physical and social barriers and is supported by programs, services, and technologies that promote mental and physical health and enable even people with capacity loss to continue to engage in the activities they value.

The age-friendly network has grown from 11 membership cities in 2010 to 760 communities and cities by September of 2018, covering 39 of the 194 WHO member states. Some of the age-friendly initiatives reported by WHO (2018d) include Ottawa, Canada, adding modified fitness equipment to recreation areas, removing tripping hazards from sidewalks, and adding outdoor benches. Intergenerational exchange is promoted in the educational plan of Loncoche, Chile. In Melville, Australia, cafes are dedicating spaces for individuals with dementia to meet with friends and family members.

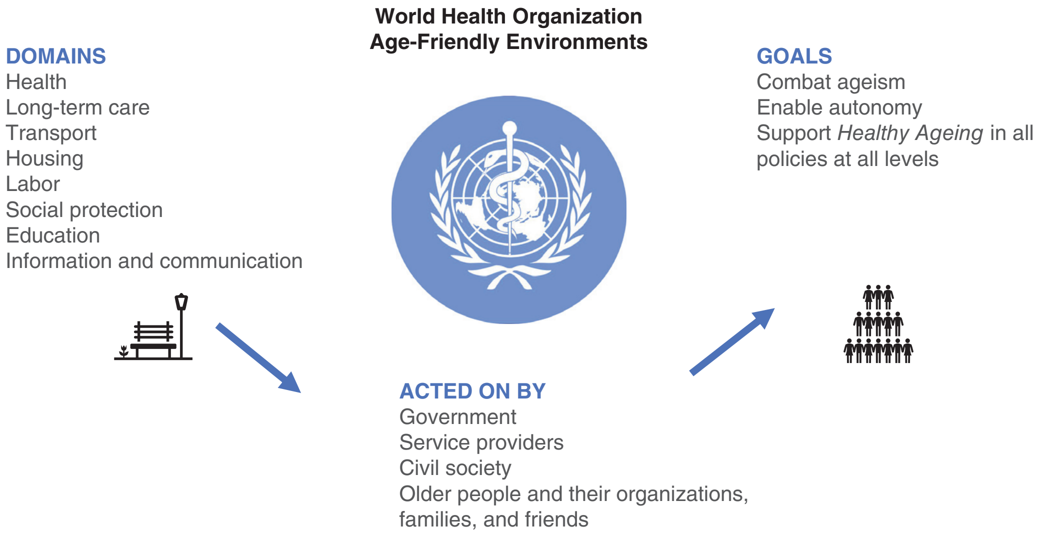
The WHO's definition of an age-friendly environment has stimulated an area of research that includes the age-friendly community as well as the age-friendly university (Silverstein et al., 2019). Age-friendly universities were described in Chapter 7. These educational environments may reduce institutional ageism directed against older members of the community (Whitebourne & Montepare, 2017) and may also promote intergenerational learning. The course you are taking now, particularly if it includes contact with older learners or members of the community, would be an example of the type of effort that can produce more age-friendly learning environments.

One manifestation of ageism that could be addressed by an age-friendly environment is the way in which older adults come to view themselves. According to the **communicative ecology model of successful aging (CEMSA)**, their own ways of seeing, and talking about, themselves can influence the way older adults feel about aging and, ultimately, their actual ability to age successfully (Fowler et al., 2015). According to CEMSA, people have great uncertainty about aging, which influences the way they talk about their own aging. The communication strategies they use in response to this uncertainty can alter their levels of self-efficacy about aging. The higher their self-efficacy, the more likely they will, as predicted by CEMSA, be able to age successfully (Figure 14.9).

The communication strategies specific to CEMSA include expressing optimism about the aging process, not using age as a reason for general problems or limitations (i.e., not using the term “senior moment”), avoiding use of age stereotypes when referring to or thinking about other older adults, planning for the future with the assumption that one will be there to enjoy it, and not giving up on trying to use new technology strategies such as social media and cell phones. Older adults can also change the context in which they age by effectively managing ageist treatment by others to let them know that this sort

FIGURE 14.8

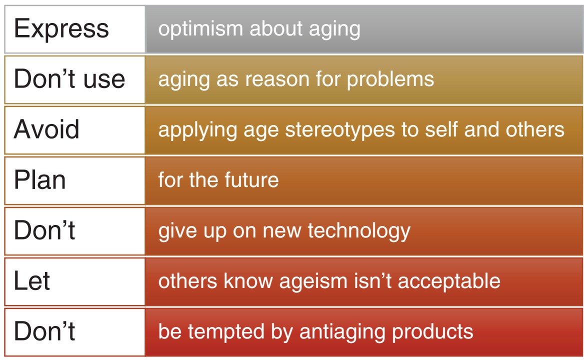
Model of Age-Friendly Environments


World Health Organization
Age-Friendly Environments
DOMAINS
Health
Long-term care
Transport
Housing
Labor
Social protection
Education
Information and communication
GOALS
Combat ageism
Enable autonomy
Support *Healthy Ageing* in all
policies at all levels
ACTED ON BY
Government
Service providers
Civil society
Older people and their organizations,
families, and friends

The World Health Organization's criteria for age-friendly environments.

FIGURE 14.9

Communication Ecology Model of Successful Aging



Express	optimism about aging
Don't use	aging as reason for problems
Avoid	applying age stereotypes to self and others
Plan	for the future
Don't	give up on new technology
Let	others know ageism isn't acceptable
Don't	be tempted by antiaging products

According to the CEMSA model, these are the strategies that older adults should use to be able to avoid the limitations of ageism.

of language is not acceptable. Finally, CEMSA advocates that older adults not allow themselves to be swayed by "peddlers of anti-aging products … to recognize and resist the images propagated by an industry whose profitability rests on inducing their self-loathing" (p. 437).

Successful aging is a complex process involving many moving parts. Older adults are able to develop a sense of high subjective well-being even in the face of daunting challenges. Although researchers are beginning to view subjective well-being as subject to potential threats very late in life, the vast majority of older adults avoid becoming depressed or even dissatisfied with their life situations. New approaches that can alter the environment in which individuals age can further take advantage of the strengths already evident in these aging individuals.

CREATIVITY AND AGING

You do not have to be a creative genius to age successfully, but the older adults who have become the creative geniuses of the past and present seem, to many, to represent the most successful agers of all. Understanding the factors that contribute to their ability to retain their creativity can provide new pathways to promote the successful aging of ordinary individuals (Palmiero et al., 2016a).

What Is Creativity?

A creative person is conventionally thought of as someone who has the ability to produce a notable or extraordinary piece of work; however, more generally, researchers define **creativity** as the ability to generate products or ideas that are original, appropriate, and have an impact on others. The originality inherent in creativity means that ideas or products are novel rather than being copies, precise renderings from a set of instructions, or mass-produced. In terms of appropriateness, this might be considered a subjective quality, but in the context of creativity, it implies that other people appreciate the work and may want to purchase or use it (Runco & Beghetto, 2019).

That creative products have an impact on others is a quality that you might be able to attest to from your own experience. You may listen to a piece of music and feel that it expresses the way you are feeling or have felt in the past. That music will stay with you more than will the notes of a piece that seem to have less personal meaning.

Think about the people you would nominate as most creative. Some of them may be eminent or popular artists, musicians, or writers, but some may be people you interact with in your family or among your friends. Perhaps you have an aunt who can take an ordinary room and with just a little rearrangement make it more inviting and comfortable. A grandmother who cooks for family celebrations may seem to have an endless set of new ideas for decorating cupcakes, never repeating the same recipe or finishing touches from holiday to holiday. To distinguish eminent creativity from everyday creativity, researchers talk about "Big C" (eminent) and "little c" (everyday); individuals may also show "mini-C" creativity, which refers to creativity in constructing personal, or self, understanding (Beghetto & Kaufman, 2007).

Among your list of highly creative people, there are undoubtedly not only older relatives with talent at various feats of homemaking but also famous painters or musicians with long and highly successful careers, ranging from the singer Cher to the painter Pablo Picasso. What factors do you believe might support their continued ability to deserve acclaim?

Experimental studies of creativity linking the ability to generate novel ideas with cognitive abilities suggest that older creative adults appear to have greater cognitive reserve (Palmiero et al., 2016b). Personality may also play a role in promoting creativity in later life as indicated by the finding that older individuals higher in openness to experience show greater activation of brain regions involved in maintaining cognitive flexibility (Sutin et al., 2009).

Personality openness may, in turn, be a protective factor against mortality. In a longitudinal study of aging veterans, Turiano and colleagues (2012) found a positive association between scores on the creativity facet of openness to experience and lower risk of mortality. The protective effects of personality creativity remained statistically significant even after the researchers controlled for other correlates of mortality including age, education, health status, and health risk behaviours.

One approach to understanding the neuroscience of creativity in older adults involves studying the connections between the brain's default brain network and the executive functions carried out in the prefrontal cortex. As mentioned earlier, pathways involved in the default network may be involved in successful cognitive aging. The default network would support creative thinking in the stage at which individuals come up with new ideas. Evaluating the quality of these ideas would be the task of the executive control network. Older adults with higher scores on divergent thinking task performance (e.g., coming up with as many uses of a common object as possible) showed stronger connections between these two brain regions than was true for younger adults (Adnan et al., 2019). This finding suggests that older adults may be better able to take advantage of the greater storehouse of knowledge they have accumulated over their lifetimes.

Creative Older Adults

This conceptual background to understanding creativity shows that creativity may involve many of the same features as successful aging. Among the ranks of the eminently creative (who are creative with a "capital C") are highly successful artists, musicians, writers, and performers who continued to produce highly acclaimed works well into their later decades. Outside of the arts, older adults continue to make important contributions to the world in everything from politics to science.

The first systematic effort to identify age trends in productive accomplishments was the book by Harvey Lehman, *Age and Achievement* (1953). Lehman analyzed the quantity and quality of creative products by age and discipline and concluded that the peak of productivity in the adult years tends to occur prior to the age of 40, often between 30 and 35. However, Lehman found that earlier peaks are reached in the sciences and in fields in which success was dependent on intellectual imagination and physical ability. Later this observation was dubbed the **Planck hypothesis** after the brilliant German scientist Max Planck, to refer to the tendency of peak scientific productivity to occur in early adulthood (Dietrich, 2004).

Lehman claimed that older adults are most likely to retain their productivity in fields that rely on experience and judgement, such as politics and diplomacy. Authors write their "best books" in between these extremes, for an author's success involves imagination, discipline, and the philosophical perspectives gained from experience. He also noted that some artists who lived until very old age produced their best works very late in life, as did other notable individuals in virtually every field of accomplishment.

Rather than take quality into account, a judgement that can involve subjectivity (which is "better," an early or a late Picasso?), the approach adopted by Dennis (1966) relied only on total output by age of productions by artists and scientists. This analysis yielded a pronounced peak age of productivity for artists in the decade of the 40s, followed by a steep drop-off thereafter. Scientists also showed a peak in the 40s, but their productions were more likely to be spread across the 40s, 50s, and 60s. Noting that Lehman's analysis was limited by the fact that those who died before old age could not be counted (the survivor effect once again), Dennis limited his sample to people who lived to be at least 80 years old. This approach, however, eliminated such creative individuals as Mozart, Van Gogh, and even Shakespeare, all of whom died well before late adulthood.

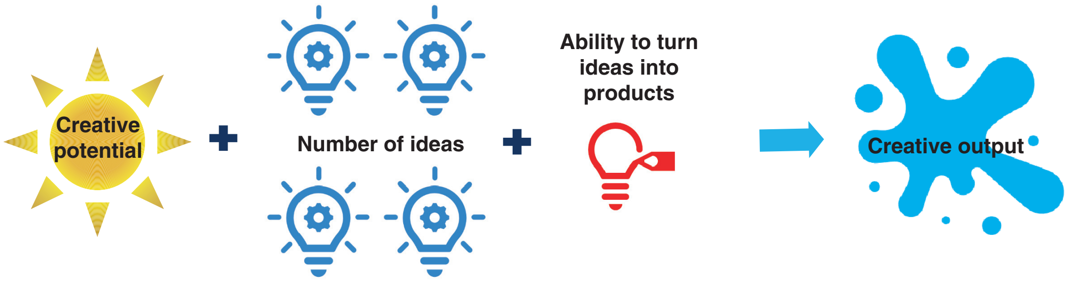
More recently, the work of Simonton takes into account factors other than simple chronological age as a way to characterize the age–creativity relationship. Figure 14.10 summarizes the key elements of this model. **Creative potential** is the total number of works that a person could hypothetically produce in a life span with no upper limits. The grandmother with a seemingly infinite supply of cupcake ideas would, in this model, be high in creative potential. On the other hand, a person with low creative potential may continue to bake the very same cake, year in and year out, without variation. In the musical world, such individuals are called "One-Hit Wonders."

Creative potential becomes the inspiration, then, for the number of ideas an individual can generate. Next, however, the task becomes one of turning those ideas into products, also known as elaboration. Successful creative individuals are able to put their ideas into words, pictures, notes, or published research papers. An individual's creative career, according to Simonton, will reflect the combination of all three factors.

Simonton also tackled the question of how best to take age into account, including not only age at death but also **career age**, or the age at which an individual began to produce creative

FIGURE 14.10

Simonton's Model of Creative Productivity



Simonton's model of creativity predicts creative output from these three components.

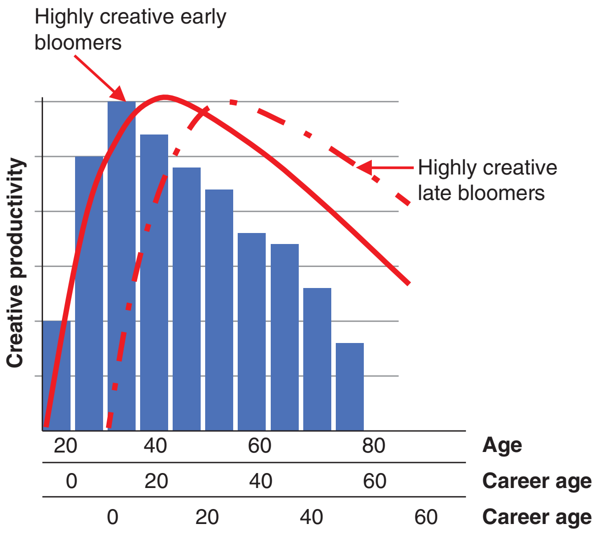
works. People with similar high degrees of creative potential (or total number of ideas) who start out early in life will peak earlier than those who start out later. You can see these relationships in Figure 14.11, in the distinction between early and late bloomers.

Of course, those who die prematurely can never be evaluated even with this model. For example, Margaret Mitchell wrote *Gone with the Wind*, her only published novel, at the age of 35 after spending the early years of her career as a journalist. Because she died at the age of 48, she can only be considered a One-Hit Wonder rather than a late bloomer, though she may have produced more if she had survived past middle age.

The age at death is not factored into Simonton's calculations, meaning that the model still suffers from the problem of not counting the works of people who might have been productive into later adulthood. The general curve that characterizes productivity averages across a large enough number of creative individuals, however, was based on mathematical formulas that could take this problem into account to a certain extent.

FIGURE 14.11

Creativity by Age and Career Age



Age, levels of creativity, and career age must be considered in predicting whether individuals will retain their creativity into later life.

Simonton's model does not take the quality of an individual's productions into account. However, according to his **equal odds rule**, creative individuals who produce more works are more likely to produce one or more of high quality than those who produce fewer works.

If this sounds familiar, it is because it is the same as the law in sports that "If you don't shoot, you can't score." The equal odds rule implies that people are most likely to produce their best work during their peak period of productivity on the basis of probability alone. Verdi composed his first operatic masterpiece at the age of 29 and his last at the age of 80. He had a relatively high probability of creating a masterwork during his late career because he continued to produce such a large number of pieces of music right up until the end.

A variant of the equal odds rule is the **blind variation and selective retention (BVSR) theory**, which proposes that true creativity requires producing a large number of ideas in trial-and-error fashion, the best (most creative) of which will remain in the wake of all the failed ones (Simonton, 2015).

Contemporary older adults have an even better chance of remaining productive throughout their later years than those living in previous centuries (Simonton, 2012). As life expectancy continues to increase with improvements in health care and other living conditions, older adults are likely to have a longer empty nest period after their children leave the home. Modern technology also makes more resources available on the Internet so that the artist need not be the "lone genius" of years past. With more leisure time, the older artist also has the chance to pursue multiple interests, making it possible to continue to develop the personality openness that fosters creativity. Improved communication also means that artists, scientists, writers, and creative individuals from many fields can collaborate to cross-foster new ideas and projects. Older and younger collaborators can further enhance each other's productivity, leading both to improve the quality and quantity of their output.

Characteristics of Last Works

However many creative works that older artists and writers produce are characterized by the **old age style**, a special quality that is common to their work.

FIGURE 14.12

Characteristics of Old Age Style

Negative features	Positive features
More pessimistic view of life	More expressive, less realistic
Sense of isolation	Accumulation of symbolism
Choice of tragic themes	More freedom in use of paintstrokes
Feeling of imminent departure	Richer in meaning

The negative versus positive features of the work of older artists, called the old age style.

The art critic Kenneth Clark (2006), in characterizing the paintings of late-life artists (see Figure 14.12), notes that they are "pessimistic and not concerned with the imitation of natural appearances" (p. 80). The themes that emerge in the works of late-life artists are more likely to express tragic rather than uplifting themes, and they may stem from feelings of social isolation and the need to deal with physical limitations. Consider the amount of stamina required to produce a sculpture or an oil painting. Interestingly, in contrast to what you might expect from socioemotional selectivity theory, these older artists feel frustrated that their time is running out, what Clark calls a sense of "imminent departure."

On the positive side, and perhaps because of that sense of time running out, older artists are less preoccupied with realism, and their work becomes more expressive. They even show a greater freedom in their use of paint and the strokes appear to stand out more from the canvas. The meanings that older artists attempt to convey, additionally, appear to be deeper and more symbolic.

Aging artists may also confront limitations due to changes in vision. Claude Monet, famous for his impressionistic paintings of water lilies, developed cataracts at a time when cataract surgery was far less common and more complicated than today. However, at the age of 85, he had successful cataract surgery and went on to complete an enormous water lilies project that was installed in a Paris museum after his death. Other artists such as Georgia O'Keeffe and Henri Matisse faced sensory and physical limitations at the end of their lives, which they overcame by changing their mediums from painting to sculpture (O'Keeffe) and collages (Matisse).

Thus, when you see a creation produced by an older artist showing the old age style, you are likely to have a strong emotional reaction rather than be as focused on the details of the work's rendering. Although many of the artists showing old age style were painters, the old age style can also characterize sculptures. Rather than carve out each detail, the sculptor will have concentrated more on the form and underlying emotion of the piece.

The emergence of an old age style can be seen in the works of history's most famous artists, including Michelangelo, Rembrandt, Renoir, Matisse, Degas, Georgia O'Keeffe, and Picasso. Henri Matisse explicitly talked about this change in his own perspective as a "distillation of form. I now keep only the sign which suffices, necessary for its existence in its own form, for the composition as I conceive it" (Brill, 1967). Another excellent example of the old age style is provided by the work of Michelangelo, who sculpted a Pietà late in his life (the Pietà Rondanini), less detailed than the more meticulously sculpted iconic Pietà in the Vatican for which he is much more famous. Some art historians regard the later work as more emotionally charged and hence effective.

It is likely that, even without knowing the age of artists when you study their creations, you could guess which ones were from early and which were from later periods of their lives. Lindauer (1993) presented undergraduate students with pairs of images from artists at younger and older ages and had them rate which were completed in late life. Nearly two-thirds of the students were able to make the correct identifications, using the criteria of style differences, age, and detail. The artists represented in the study ranged from classic to contemporary and included both realistic and abstract themes.

Lindauer also surveyed artists who were between 60 and 80 years to find out about their own perceptions of age-related changes in their work. Although they did not perceive their own styles to have changed drastically, they did acknowledge changes due to physical and sensory limitations. On the positive side, though, they felt that their accumulated experience caused them to produce work that was steadily and consistently better.

As a preface to the old age style, creativity may be expressed in midlife as "paring down life to the essentials." Midlife may bring with it not a crisis involving confrontation with mortality, but a heightened sense of urgency to create a lasting legacy. Strenger (2009), from this vantage point, analyzed the productive works of a 20th-century educator in the business field, Charles Handy. At the age of 49, Handy left behind a prestigious position in industry because he felt that he had lost touch with his sense of inner purpose. He started a new life as an author and, having written 17 books between the ages of 50 and 75, sought and eventually found new meaning in life.

Clark (2006) also took on the question of old age style in literature and music. The last play of Shakespeare, who died at about age 50, was *The Tempest*. The lines and theme of this play convey, according to Clark, "characteristics that only an artist who has lived his life could give … (and more than) the earlier plays it creates a private world of the imagination" (p. 88).

There is some debate about whether older musicians show the old age style. Termed the **swan song**, the musical form of old age style was defined as the last burst of creativity of an older musician (Simonton, 1989). The melody of the swan song, by definition, should be more compelling than earlier compositions because it is shorter and simpler. However, in a reanalysis of data from 2,270 works by 57 composers using hierarchical linear modeling, not a single case of a swan song could be reliably identified. Even so, the authors of this critique note the value of studying creativity in aging musicians as they cope with age-related changes. For example, Beethoven became deaf, and Bach became blind in their later years (Meredith & Kozbelt, 2014).

Another quality that the work of older artists may demonstrate is **lastingness** in that they persist over time; "that which does not end" (Delbanco, 2011, p. 244). Creative older adults experience a deep sense of gratification and experience the process as rewarding regardless of the result. However, works that endure nevertheless resonate and touch the lives of others.

The work of scientists and academicians may show a different set of changes as they age. According to the Planck hypothesis, the work of young scientists is more innovative than that of older scientists. Perhaps reflecting in part the nature of scientific discovery, and in part the greater experience they gain in their field, older scientists shift their priorities. The aging scientist may become more involved in the writing of texts and integrative review articles rather than in conducting research to produce new scientific discoveries. If scientists work in academic settings, they may move up the administrative hierarchy to a position of authority, meaning that they have less time for their own research.

Some aging academicians turn to the subject of aging; this was true for B. F. Skinner, who wrote *Enjoy Old Age: A Practical Guide* (Skinner & Vaughan, 1983) towards the end of his life. In fact, the first geriatrics text was written by Sir John Floyer in the early 1700s when he was 75 years old. An aging inventor may start to address age-related concerns, as was the case for Benjamin Franklin, who fabricated the first known pair of bifocals when he was 78 years old, well past the age when most people start to need them.

Biopsychosocial Perspectives on Creativity and Aging

From a biopsychosocial perspective, it is clear that creativity in later life may reflect the physical changes that individuals experience as they age. In addition, returning to the earlier discussion of the neuroscience of creativity, older artists, writers, and scientists may be able to draw from a deep reservoir of past experiences that informs their work.

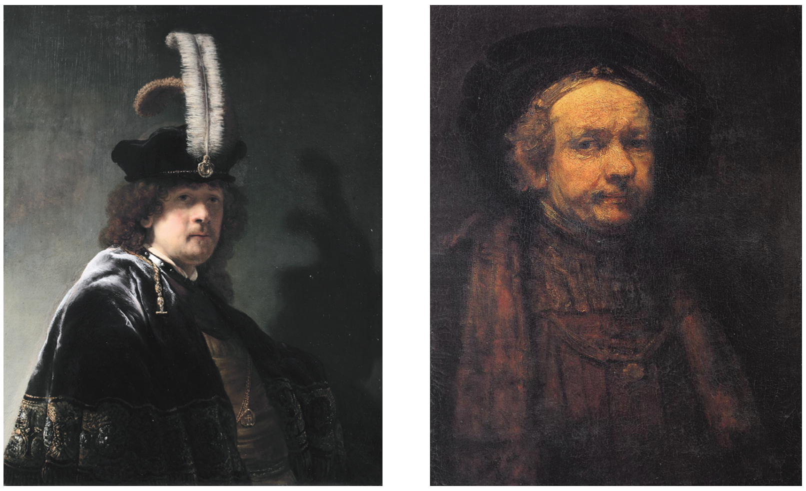
Personality flexibility also appears to play a role in the approach to their work taken by highly creative individuals even into their 90s and 100s (Antonini et al., 2008). Rather than dwell on their past accomplishments, these individuals continue to look forward to new goals and new creative enterprises. They maintain their curiosity, keeping up with the times and adapting to changing circumstances.

Cognitive flexibility and personality also appear to play a role in the productivity of less well-known individuals as they age. A 45-year longitudinal study of men originally tested in graduate school showed that those with the highest number of awards and notable publications at age 72 were higher on measures comparable to openness to experience, namely tolerance and psychological-mindedness (Feist & Barron, 2003). Creative accomplishments in the sciences, then, may reflect the role of personality in lowering behavioural inhibitions (Grosul & Feist, 2014).

Creativity can also be understood from a sociocultural perspective. Socioeconomically and racially disadvantaged individuals have a much lower chance of ever reaching old age, much less "successful" old age, as traditionally defined within psychology or the arts. Certain sectors of the population, particularly minorities from low-income backgrounds, do not have the opportunity to achieve good health and full expression of their innate abilities. Everyone we have talked about up to now came from a relatively advantaged background or at least achieved material success. For many talented individuals who are not afforded the benefits of higher levels of education and income, the creative process faces more challenges.

A second critical fact in the analyses of successful aging regards the definition of eminence as used in studies of aging and creativity. Women are far less likely than would be expected on the basis of chance to appear in lists of the creative and productive at any age. For example, it is only within the area of children's literature that Lehman (1953) listed women as constituting anywhere near 50 percent of the notable contributors. A total of only 20 women were listed in the Lehman work as "worthy of mention."

Little, if any, mention in the analysis of productivity is also made of members of ethnic or racial minorities. Simonton (1998) explored the question of whether assessments of creative output among historical figures would show evidence of bias against members of minority cultures. Specifically, he examined whether African Americans who had achieved recognition within reference works specific to Black scholarship would also be mentioned in reference works of the White majority culture. Although there was considerable convergence between the minority and majority reference works, one-fifth of African Americans who had achieved eminence in the minority reference works were not mentioned in any of the majority indices of eminence. Furthermore, certain areas of accomplishment within Black culture were not recognized within the majority reference works, including law, education, religion, classical



Source: ©National Trust Images/Chris Titmus

Source: ©National Trust Images/Chris Titmus

Rembrandt's self-portraits (30 years apart) provide an excellent example of the difference between art produced early in life (as shown on the left) with that produced later in life (shown on the right).

music, and the sciences. White reference works gave higher ratings to African Americans in the fields of athletics and in jazz and blues music, but African American sources gave greater recognition to those who achieved eminence in the civil rights movement.

These differential patterns of recognition point to distinct opportunities that affect an individual's ability to achieve career recognition, if not personal fulfillment. Clearly, differences in educational opportunities as well as cultural values play a role in determining the ultimate achievements of people from nonmajority backgrounds. Those who do manage to break through cultural barriers are likely to receive considerable recognition within their own as well as the majority culture.

Some examples of eminent minority productive agers are Jackie Robinson, the first African American to play major league baseball; Booker T. Washington, the first to receive an honorary degree from Harvard; and William Grant Still, the first to conduct a major symphony orchestra and to have his own composition performed by a major American orchestra. These "famous firsts" seem particularly important within African American reference works of eminence because they attest to the ability of highly talented and persistent individuals to overcome the effects of discrimination. That their work has until recently been overlooked in studies of aging and creativity limits the generalizability of current models of successful aging.

Figure 14.13 summarizes the biopsychosocial approach to understanding creativity in later life. Physical changes and disease as well as the neuroscience underpinnings of creativity interact with personality and the ability to draw from experience. Limitations due to lack of educational opportunities and biases against women and minorities in counts of eminence play a role in determining which older individuals are recognized as creative.

SUCCESSFUL AGING: FINAL PERSPECTIVES

People in later life appear not only to manage to feel satisfied with their lives but also to be able to achieve new forms of creative expression. Although not contained within any of the existing definitions of successful, healthy, or active and healthy

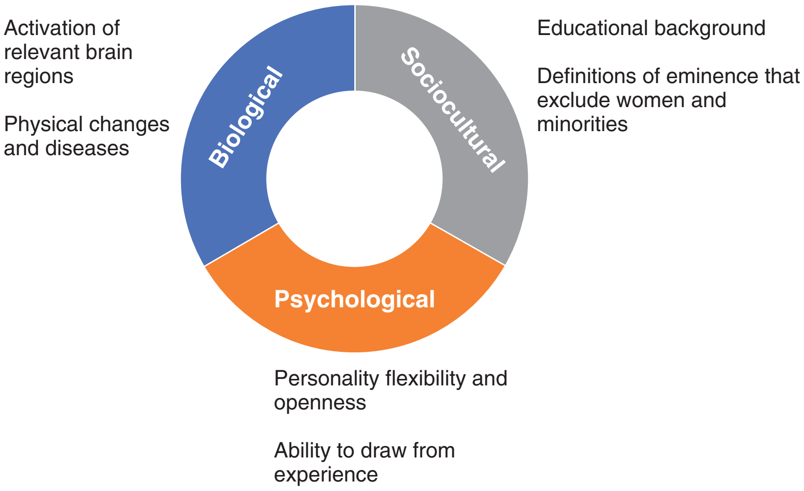

Activation of relevant brain regions
Physical changes and diseases
Biological
Sociocultural
Educational background
Definitions of eminence that exclude women and minorities
Psychological
Personality flexibility and openness
Ability to draw from experience

FIGURE 14.13

Biopsychosocial Model of Creativity in Later Life

Creativity is best understood from the biopsychosocial perspective.

aging, the ability to enjoy creativity, even with a "mini-C," can enhance individuals' lives throughout their later years.

Throughout this course, you have learned about the qualities that can influence your life as you grow older, as well as the many opportunities for change and growth that your life experiences will present to you. Becoming a "survivor," as we pointed out at the beginning of the book, is the key to reaching your later years. As you continue to develop and navigate through your adult years, we hope that you will find your personal sense of meaning to accompany a long and successful life.

SUMMARY

1. The process of successful aging involves being able to overcome the threats to physical and psychological well-being presented by the aging process. Successful aging also involves the ability to become engaged with life in terms of both relationships and productive activity; successful cognitive aging refers to individuals who perform above average compared to their age group. Subjective well-being, a component of successful aging, is higher in older adults, a phenomenon referred to as the paradox of well-being. The WHO's movement to foster global age-friendly environments will make it possible for more individuals to feel connected to their communities and be able to fulfill their personal goals, regardless of age.
2. Creativity includes the work of geniuses as well as everyday behaviours. Research on productivity and creativity has involved attempts to determine whether older individuals are more or less able to maintain the quality and quantity of works produced when younger. Simonton's model of creative productivity describes the relationship between age and production of creative works using a mathematical formula that incorporates creative potential, ideation, and elaboration based on the career age of an individual rather than chronological age. In this model, highly productive individuals begin early and maintain a high production rate long into their careers. Those who are more productive are also more likely to produce works of high quality.
3. The old age style characterizes the works of older artists and musicians. One component of the old age style is simplification of detail and increasing subjectivity. Among scientists and academicians, the old age style refers to a tendency to synthesize, producing works such as texts and reviews that integrate existing knowledge. The old age style may be a reaction to increasing proximity to death or to the presence of age-related changes or health problems.
4. Creativity is best understood from a biopsychosocial perspective, incorporating the activity of the brain, physical changes and diseases, personality openness and ability to draw on past experiences, and sociocultural factors that limit opportunities and recognition.

GLOSSARY

Accommodation: when people change their schemas in response to new information about the world.

Acetylcholinesterase: the enzyme that normally destroys acetylcholine after its release into the synaptic cleft; also called cholinesterase.

Activities of daily living (ADL): an individual's ability to complete the tasks of bathing, dressing, transferring, using the toilet, and eating.

Active aging also called active and healthy aging (AHA): according to the WHO, the process of maximizing opportunities related to health, participation, and safety in order to improve quality of life.

Activity theory: the view that older adults are most satisfied if they are able to remain involved in their social roles.

Acute stress disorder: the diagnosis given to an individual whose symptoms persist for up to a month after a trauma and include the intrusion of distressing reminders of an event; dissociative symptoms, such as feeling numb or detached from others; avoidance of situations that might serve as reminders of the event; and hyperarousal, including sleep disturbances or irritability.

Adrenopause: the phenomenon where DHEA, which is higher in males than females, shows a pronounced decrease over the adult years.

Adult attachment theory: proposal that the early bond between the infant and caregiver set the stage for all of the individual's later significant relationships.

Adult day programs: services given to adults who need assistance or supervision during the day in a setting that is either attached to another facility, such as a nursing home, or is a standalone agency.

Adult-onset diabetes or type 2 diabetes: a disease that develops over time and gradually reduces the individual's ability to convert dietary glucose to a form that can be used by the body's cells.

Advance directive (AD): a legally binding document in which patients express their wishes for end-of-life care.

Aerobic capacity: the maximum amount of oxygen that can be delivered through the blood.

Affect regulation: the ability to increase a person's feelings of happiness and well-being.

Affective events theory: proposal that events at work lead to affective reactions; these in turn influence attitudes towards work and performance.

Age: an objectively determined measure that indicates how many years (and/or months or days) a person has lived up to the present moment.

Age-as-leveller view: proposal that as people become older, age overrides all other "isms."

Age-complexity hypothesis: proposal that through a slowing of the central processes in the nervous system, age differences increase as tasks become more complex and the older adult's processing resources are stretched more and more to their limit.

Age-friendly environment: as defined by WHO, enables people of all ages to participate in their communities, treats everyone with respect, regardless of age, makes it easy for older people to maintain their social connections, and helps people maintain their health and activity even at the oldest ages.

Ageism: a set of beliefs, attitudes, social institutions, and acts that denigrate individuals or groups based on their chronological age.

Age-related macular degeneration (ARMD): a condition caused by damage to the photoreceptors located in the central region of the retina known as the macula.

Age-specific death rate: the number of deaths in a particular age group during a given year per 100,000 population.

Age-standardized death rate: the number of deaths per 100,000 population that would have occurred in a given area if the age structure of the population of that area was the same as that of a specified standard population.

Aging in place: the principle that older adults can remain in their own homes, or at least in their own communities, with appropriate services.

Agnosia: the loss of the ability to recognize familiar objects.

Agoraphobia: the fear of being in an open or crowded space, or of being in a space from which escape is difficult.

Alveoli: tiny air sacs in the lungs where exchange of gases takes place.

Alzheimer's disease: a form of neurocognitive disorder in which the individual suffers progressive and irreversible neuronal death.

Amnesia: a condition where the individual has as the main symptom profound memory loss.

Amyloid plaque: a formation of abnormal deposits of protein fragments.

Amyloid precursor protein (APP): protein found in the normal brain.

Androgenetic alopecia: male and female pattern hair loss.

Andropause: age-related declines in the male sex hormone testosterone.

Anorexia-cachexia syndrome: a syndrome observed at the end of life in which the individual loses appetite (anorexia) and muscle mass (cachexia).

Anticholinesterase: treatments that inhibit the enzyme acetylcholinesterase.

Antioxidants: chemicals that prevent the formation of free radicals.

Anxiety disorder: disorder in which the main characteristic includes anxiety, a sense of dread about what might happen in the future.

Anxious attachment style: pattern in which individuals imagine that their adult partners will abandon them.

Aphasia: the loss of language ability.

ApoE: a protein that carries cholesterol throughout the body but also binds to beta-amyloid, possibly playing a role in plaque formation.

Apolipoprotein E (ApoE) gene: one of the prime genes thought to be involved in late-onset familial Alzheimer's disease.

APP gene: gene that appears to control the production of APP, the protein that generates beta-amyloid.

Apraxia: the loss of the ability to carry out coordinated movement.

Archival method: type of research in which investigators use available records to provide data on the hypotheses they wish to test.

Arteriosclerosis: a general term for the thickening and hardening of arteries.

Arthritis: a general term for conditions affecting the joints and surrounding tissues that can cause pain, stiffness, and swelling in joints and other connective tissues.

Assimilation: process in which people use their existing schemas in order to understand the world around them.

Assisted living facilities: housing complexes in which older persons live independently in their own apartments.

Atherosclerosis: a form of cardiovascular disease where fatty deposits collect at an abnormally high rate within the arteries, substantially reducing their width and limiting the circulation of the blood.

Attachment styles: mental representations or frameworks about what to expect in a relationship.

Attachment view of bereavement: the view that the bereaved can continue to benefit from maintaining emotional bonds to the deceased.

Attention: the ability to focus or concentrate on a portion of experience while ignoring other features of that experience, to be able to shift that focus as demanded by the situation, and to be able to coordinate information from multiple sources.

Attentional resources: a theory that regards attention as a process reflecting the allocation of cognitive resources.

Autobiographical memory: the recall of information from a person's own past.

Autoimmune theory: proposal that aging is due to faulty immune system functioning in which the immune system attacks the body's own cells.

Autonomy versus shame and doubt: stage in Erikson's theory when young children learn ways to be able to act independently from their parents without feeling afraid that they will venture too far off on their own.

Avoidant attachment style: a fear of abandonment so intense that individuals stay away from close relationships altogether.

Awareness of finitude: thoughts about mortality that occur when individuals pass the age when other people close to them had themselves died.

Baby boom generation: the term used to describe people born in the post-World War II years of 1946–1964.

Basal metabolic rate (BMR): the rate of metabolism.

Basic trust versus basic mistrust: stage in Erikson's theory that involves the infant's establishing a sense of being able to rely on care from the environment (and caregivers).

Behavioural approach to marital interactions: emphasizes the actual behaviours that partners engage in with each other during marital interactions as an influence on marital stability and quality.

Bereavement: the process during which people cope with the death of another person.

Berlin Wisdom Paradigm: proposal that wisdom is a form of expert knowledge in the pragmatics of life.

Beta-amyloid-42: the form of amyloid most closely linked with Alzheimer's disease which consists of a string of 42 amino acids.

Biological age: the age of an individual's bodily systems.

Biopsychosocial perspective: a view of development as a complex interaction of biological, psychological, and social processes.

Bipolar disorder: disorder in which people who have experienced one or more manic episodes during which they feel elated, grandiose, expansive, and highly energetic.

Blended families: also known as reconstituted families, family situations where at least one adult is living with a child who is not a biological child of that adult.

Blind variation and selective retention (BVSR) theory: proposal that true creativity requires producing a large number of ideas in trial-and-error fashion, the best (most creative) of which will remain in the wake of all the failed ones.

Blurred retirement pattern: a pattern of retirement in which workers exit and re-enter the workplace several times.

Body mass index (BMI): an index of body fat calculated by dividing weight in kilograms by (height in meters) squared.

Bone remodelling: a process in which old bone cells are destroyed and replaced by new cells.

Borderline personality disorder: a set of symptoms that include extreme instability in sense of self and relationships with others, sexual impulsivity, fear of abandonment, and difficulties controlling their emotions.

Boundaryless career: a career that crosses the boundaries of an employer or organization; people with this mindset seek opportunities for development in their jobs.

Bridge employment: retirement pattern in which retirees work in a completely different occupation than they had during most of their adult life.

Brinley plot: plot in which reaction times of older adults are graphed against those of younger adults.

Calling: the choice of occupation based on a combination of factors related to career development, job satisfaction, well-being, and personal growth.

Caloric restriction: the view that they key to prolonging life is to restrict the number of calories that individuals consume.

Canada Pension Plan: a social insurance program that requires all employed Canadians 18 years of age and older to contribute a portion of their earnings to a nationally administered pension plan.

Canadian Human Rights Act: a statute passed by the Parliament of Canada in 1977 to protect Canadians from discrimination-based factors such as age or sex; it strives to create equal opportunities for all Canadians.

Cardiac output: the amount of blood that the heart pumps per minute.

Cardiovascular disease: a term that refers to a set of abnormal conditions that develop in the heart and arteries.

Career age: the age at which an individual begins to embark on his or her career.

Career plateauing: term that refers to static period of vocational development.

Career: the term that captures the unique connection between individuals and social organizations over time.

Caregiver burden: the term used to describe the stress that caregivers experience in the daily management of their afflicted relative.

Caregivers: individuals, usually family, who provide support to people with chronic diseases.

Case report: research method that provides in-depth data from a relatively small number of individuals.

Cataract: a clouding or opacity in the lens of the eye.

Cattell–Horn–Carroll (CHC) model of intelligence: proposal that there is a three-tier structure to intelligence.

Centenarians: people who are 100 years old and older.

Center for Epidemiological Studies Scale for Depression (CES-D): a 20-item questionnaire that screens for depressive symptoms.

Cerebrovascular accident: also known as a “stroke” or “brain attack,” an acute condition in which an artery leading to the brain bursts or is clogged by a blood clot or other particle.

Choice reaction time tasks: tasks used to measure processing speed in which respondents must make one response for one stimulus and another response for a different stimulus.

Chromosomes: distinct, physically separate units of coiled threads of DNA and associated protein molecules.

Chronic obstructive pulmonary disease (COPD): a group of diseases that involve obstruction of the airflow into the respiratory system.

Chronosystem: from the ecological perspective, changes that take place over time.

Circadian rhythm: the daily variations in various bodily functions.

Classic aging pattern: an inverted U-shaped pattern, with a peak of intelligence in early adulthood followed by steady decline.

Climacteric: the gradual winding down of reproductive ability in men and women.

Clinical interview: a series of questions that clinicians administer in face-to-face interaction with clients.

Cognition: the way the mind works; specifically, the processes of attention, memory, intelligence, problem-solving, and the use of language.

Cognitive-behavioural therapy (CBT): an approach in which the clinician encourages clients to develop more adaptive behaviours and ways of thinking about their experiences.

Cohabitation effect: the greater likelihood of divorce among couples who cohabitate before becoming engaged.

Cohabitation: living in a stable relationship prior to or instead of marrying.

Cohort effects: the social, historical, and culture influences that affect people during a particular period of time.

Cohort: a term used to describe the year (or period) of a person’s birth.

Cohort-sequential design: method in which cohorts are compared at different ages.

Collagen: the fibrous protein that makes up about one-quarter of all bodily proteins.

Communicative ecology model of successful aging (CEMSA): approach to successful aging proposing that the way older adults communicate about aging influences the way they feel about aging and, ultimately, their actual ability to age successfully.

Communication predicament model: model proposing that when older adults are thought of as mentally incapacitated, leading younger people to speak to them in a simplified manner (using elderspeak). Over time, this can have the effect of reducing the older adult’s actual ability to use language.

Compensation-Related Utilization of Neural Circuits Hypothesis (CRUNCH) model: approach to aging of the brain proposing that the demands of cognitively challenging tasks cause an overall excitation of neural activity in older adults.

Competence–press model: predicts an optimal level of adjustment that institutionalized persons will experience when their levels of competence match the demands, or "press," of the institutional environment.

Comprehension knowledge (Gc): originally called crystallized intelligence, represents the acquisition of specific skills and information that people gain as the result of their exposure to the language, knowledge, and conventions of their culture.

Compression of morbidity: the concept that the illness burden to a society can be reduced if people become disabled closer to the time of their death.

Computed axial tomography (CAT or CT scan): an imaging method that clinicians and researchers use to provide an image of a cross-sectional slice of the brain from any angle or level.

Congestive heart failure (or heart failure): a condition in which the heart is unable to pump enough blood to meet the needs of the body's other organs.

Congruence: situation in which one's vocational type matches one's occupational environment.

Conjunction visual search: search in which the target differs from the distractors in more than one way.

Contextual influences on development: the effects of sex, race, ethnicity, social class, income, religion, and culture on development.

Contingency theory: proposal that parents may provide help to their children because they perceive that the children need this support.

Continuity principle: the changes that people experience in later adulthood build on what they lived through in their earlier years.

Continuity theory of retirement: proposal that retired individuals maintain the ties they had to society when they were working.

Continuity theory: proposal that whether disengagement or activity is beneficial to the older adult depends on the individual's personality.

Coping: the actions people take to reduce stress.

Core self-evaluations: a person's appraisal of people, events, and things in relation to oneself.

Coronary (ischemic) heart disease: a condition caused by atherosclerosis, which blocks the blood supply to the heart muscle.

Correlation: statistic that expresses the strength and direction of a relationship between two variables.

Correlational design: a research design in which researchers investigate relationships among two or more variables.

Correspondence principle: proposal that people's life events that reflect their personality traits; once these events occur, they further affect people's personalities.

Cortisol: the hormone produced by the adrenal gland.

Creative potential: the total number of works that a person could hypothetically produce in a life span with no upper limits.

Creativity: the ability to generate products or ideas that are original, appropriate, and have an impact on others.

Crisp retirement pattern: a pattern of retirement in which workers leave the workplace in a single, unreversed, low-to-moderate exit.

Cross-linking theory: proposal that aging causes deleterious changes in cells of the body that make up much of the body's connective tissue.

Cross-sectional design: a research design where groups of people are compared with different ages at one point in time.

Cross-sequential design: method in which cohorts are examined at different times of measurement.

Crude death rate: the number of deaths during a given year per 100,000 population.

Crystallized intelligence: represents the acquisition of specific skills and information that people gain as the result of their exposure to the language, knowledge, and conventions of their culture.

Culture Change Movement: philosophy that services for older adults should promote person-centered care, allowing individuals to feel "at home" despite living in institutional settings.

Daily diary method: a research method in which participants enter data on a daily basis.

Death: the irreversible cessation of circulatory and respiratory functions, or when all the structures of the brain have irreversibly ceased to function.

Death ethos: the prevailing philosophy of death of a culture.

Death with dignity: the idea that death should not involve extreme physical dependency or the loss of control of bodily functions.

Debriefing: a procedure that reveals a study's purpose and answers to the participant after testing has completed.

Default network: a circuit in the brain that is active while the brain is at rest.

Dehydroepiandrosterone (DHEA): a weak male steroid (androgen) produced by the adrenal glands.

Delirium: an acute cognitive disorder that is characterized by temporary confusion.

Dementia: term no longer in clinical use that referred to a loss of cognitive abilities.

Deoxyribonucleic acid (DNA): a molecule capable of replicating itself that encodes information needed to produce proteins.

Dependent variable: the outcome of a manipulation that researchers observe.

Dermis: the middle layer of the skin containing protein molecules of elastin and collagen, among which various nerve cells, glands, and the hair follicles reside.

Descriptive (single-factor) research design: method that catalogues information about how people perform based on their age but does not attempt to rule out social or historical factors.

Developmental schism: situation when there is a gap between the two generations in how much they value the relationship and whether they wish to be independent.

Developmental science: a term replacing "developmental psychology" that expands the focus of life span development to include a broader variety of domains.

Diabetes: a disease where individuals are unable to metabolize glucose, a simple sugar that is a major source of energy for the body's cells.

Diagnostic and Statistical Manual (DSM): the major reference used by mental health professionals in the United States and Canada to diagnose people with psychological disorders.

Dialectical thinking: related to the postformal stage of cognitive development involving an interest in and appreciation for debate, arguments, and counterarguments.

Diffuse tensor imaging: brain scanning method that reveals the structure and integrity of white matter.

Disengagement theory: the view that the normal and natural evolution of life causes older adults to wish to loosen their social ties.

Disillusionment pathway: relationship type where a couple starts out happy but gradually falls out of love.

Divorce proneness: tendency for people to be likely to contemplate divorce when their marriage is in trouble.

Dizziness: an uncomfortable sensation of feeling lightheaded and even floating.

Do not resuscitate (DNR) order: directs health care workers not to use resuscitation if the patient experiences cardiac or pulmonary arrest.

Doing gender: a term that refers to the tendency of women and men to behave in stereotypically gendered ways.

Donepezil hydrochloride: a generic version of the drug Aricept.

Donut hole: the coverage gap in Medicare Part D within each calendar year when patients pay a higher percentage of certain drugs until they reach a certain threshold.

Dual-process model of coping with bereavement: proposal that the practical adaptations to loss are as important to the bereaved person's adjustment as the emotional.

Dyadic withdrawal: the process of reducing the individual friendships of the couple and increasing the joint friendships.

Dying: the period during which the organism loses its vitality.

Dying trajectory: the temporal pattern of the disease process leading to a patient's death

Dysphoria: sad mood.

Dysthermia: a condition in which the individual shows an excessive raising of body temperature (hyperthermia) or excessive lowering of body temperature (hypothermia).

Early-onset Alzheimer's disease: a form of Alzheimer's that strikes at the relatively young age of 40 to 50 years.

Ecological perspective: identifies multiple levels of the environment as they affect the individual's development.

Ego integrity versus despair: stage in Erikson's theory in which individuals face psychosocial issues related to aging and facing their mortality.

Ego psychology: the belief that the ego plays a central role in actively directing behaviour.

Ego: the part of the mind that controls rational thought.

Elastase: an enzyme that breaks down the elastin found in lung tissue.

Elder abuse: a large category of actions taken directly against older adults that inflict physical or psychological harm.

Elderspeak: a speech pattern directed at older adults similar to the way people talk to babies.

Electroconvulsive therapy (ECT): a method of treatment for depression in which an electric current is applied through electrodes attached across the head.

Electroencephalogram (EEG): a brain scanning method that measures electrical activity in the brain.

Emergent distress pathway: couple whose relationship problems develop over time.

Emerging adulthood: the transition prior to assuming the full responsibilities associated with adulthood normally associated with the years 18 to 29.

Emotional labour: the requirement of service-oriented jobs in which workers must smile and maintain a friendly attitude regardless of their own personal feelings or emotions.

Emotion-focused coping: coping in which people attempt to reduce their stress by changing the ways they think about the situation.

Empty nest: describes the period in a couple's life that occurs when their children permanently depart from the home.

Endocrine system: a large and diverse set of glands that regulate the actions of the body's other organ systems.

Enduring dynamics pathway: proposal that how a couple interacts early in their relationship will characterize the course of the relationship over time.

Epidemiology: the study of the distribution and determinants of health-related states or events (including disease).

Epidermis: the outermost layer of the skin that protects the underlying tissue.

Epigenetic principle: in Erikson's theory, the proposal that asserts that each stage unfolds from the previous stage according to a predestined order.

Episodic memory: memory for events that took place in the past.

Equal odds rule: the principle that creative individuals who produce more works are more likely to produce one or more of high quality than are those who produce fewer works.

Equilibrium: process occurring when assimilation and accommodation are perfectly balanced.

Equity theory: proposal that partners are satisfied in a relationship if they feel they are getting what they deserve.

Erectile dysfunction: a condition in which a man is unable to achieve an erection sustainable for intercourse.

Error catastrophe theory: proposal that the errors that accumulate with aging are ones that are vital to life itself.

Error theories: proposal that mutations acquired over the organism's lifetime lead to the malfunctioning of the body's cells.

Ethnicity: captures the cultural background of an individual, reflecting the predominant values, attitudes, and expectations in which the individual has been raised.

Everyday problem-solving: involves problems that typically occur in people's daily lives, that can be solved in more than one way, and that require the problem solver to decide which strategy will lead to the desired result.

Evidence-based practice: proposal that clinicians should integrate the best available research evidence and clinical expertise in the context of the cultural background, preferences, and characteristics of clients.

Executive functioning: higher-order cognitive skills, including judgment, knowledge, and decision-making.

Exosystem: from the ecological perspective, includes the environments that people do not closely experience on a regular basis but that impact them nevertheless.

Experimental design: research method in which an independent variable is manipulated and scores are then measured on the dependent variable. Involves random assignment of respondents to treatment and control groups.

Extrinsic factors in vocational satisfaction: features that accompany the job but are not central to its performance.

Fat-free mass (FFM): lean tissue in the body.

Fear of falling: the anxiety about the fear of falling; this anxiety can create a vicious cycle in which older individuals increasingly restrict their movement.

Filial anxiety: the fear of having to take care of an aging, infirmed parent.

Filial maturity: occurs when children reach the age of relating to their parents as equals.

Filial obligation or filial piety: the cultural values that adult children are expected to care for their parents, meaning that they feel committed to taking care of their parents should this become necessary.

Five-Factor model (FFM): a theory intended to capture all the essential characteristics of personality in a set of five broad dispositions.

Flashbulb memory: the recall of important and distinctive events that stand out from other memories of past events.

Fluid reasoning (Gf): the individual's innate abilities to carry out higher-level cognitive operations involving the integration, analysis, and synthesis of new information.

Fluid-crystallized theory (Gf-Gc): the view that intelligence should be divided into two distinct factors.

Focus group: research method in which respondents meet and discuss a particular topic that the researcher assigns to them.

Formal operations: the ability of adolescents and adults to use logic and abstract symbols to arrive at solutions to complex problems.

FOXO genes: a group of genes that are involved in crucial cellular processes regulating stress resistance, metabolism, the cell cycle, and the death of cells.

Free radical theory: proposal that the cause of aging is the increased activity of unstable compounds that compromise the cell's functioning.

Free radicals: unstable compounds produced when certain molecules in cells react with oxygen.

Friendship styles: individual differences in approaches towards friendships.

Frontotemporal neurocognitive disorder (FTD): a neurocognitive disorder that involves specifically the frontal lobes of the brain.

Functional age: approach defining age based on performance rather than chronological age.

Functional magnetic resonance imaging (fMRI): a type of scan that can be used to show changes in the brain over the course of a mental activity.

g or general factor: the ability to infer and apply relationships on the basis of experience.

Galantamine: a drug (brand name Razadyne) used to treat dementia caused by Alzheimer's disease.

Gender gap: expressed as a proportion of women's to men's salaries.

Gender: an individual's identification as male, female, or non-binary.

Gene: the functional unit of a DNA molecule carrying a particular set of instructions for producing a specific protein.

General slowing hypothesis: proposal that the increase in reaction time reflects a general decline of information processing speed within the nervous system of the aging individual.

Generalized anxiety disorder: disorder in which the individual experiences an overall sense of uneasiness and concern without specific focus.

Generativity versus stagnation: stage in Erikson's theory when middle-aged adults focus on the psychosocial issues of procreation, productivity, and creativity.

Genome: the complete set of instructions for "building" all the cells that make up an organism.

Genome-wide association study: a method used in behaviour genetics in which researchers search for genetic variations related to complex diseases by scanning the entire genome.

Genome-wide linkage study: a method used in behaviour genetics in which researchers study the families of people with specific psychological traits or disorders.

Geriatric Depression Scale (GDS): a depression screening instrument that asks individuals to answer a true–false set of questions about symptoms of depression.

Geriatrics: the medical specialty in aging.

Gerontology: the scientific study of the aging process.

Gini coefficient: an index of income inequality in a given economy.

Glaucoma: a group of conditions causing blindness related to changes in pressure within the eyeball.

Glucocorticoid cascade hypothesis: the view that increased cortisol levels accelerate neuronal loss in the hippocampus and that repeated (cascading) increases in cortisol over the lifetime lead to further degeneration.

Gompertz function: a plot showing the relationship between age and death rates for a given species.

Good death: the opportunity for patients to have autonomy in making decisions about the type, site, and duration of the care that they receive at the end of life.

Green House model: an alternative to the traditional nursing homes; offers older adults individual homes within a small community of 6 to 10 residents and skilled nursing staff.

Guaranteed Income Supplement: a monthly non-taxable benefit that is available to low-income seniors who meet specific criteria.

Health: a state of complete physical, mental, and social well-being; not merely the absence of disease or infirmity.

Health expectancy: the number of years a person could expect to live in good health if current mortality and morbidity rates persist.

Helicopter parents: parents who are seen as smothering and overprotecting their overly dependent children.

Hemispheric Asymmetry Reduction in Older Adults (HAROLD) model: model of plasticity in which the brains of older adults become activated in the opposite hemisphere when the original area suffers deficits.

Hierarchical linear modelling (HLM): a statistical methodology where researchers study the patterns of change within individuals over time.

High-density lipoproteins (HDLs): known as "good" cholesterol, which transport lipids out of the body.

Hippocampus: the structure in the brain responsible for consolidating memories.

Hoarding: disorder in which people collect and store seemingly useless items that they cannot discard.

Holland's vocational development theory: proposal that people express their personalities in their vocational aspirations and interests.

Home health services: provide assistance to older adults within their own private residences.

Hormone replacement therapy (HRT): a therapeutic administration of lower doses of estrogen than in estrogen-replacement therapy (ERT) along with progestin to reduce the cancer risk associated with ERT.

Hormones: the chemical messengers produced by the endocrine systems.

Hospice Palliative Care: end-of-life care that is provided in the home or hospice that provides medical and supportive services.

Hypertension: a disease in which an individual chronically suffers from abnormally elevated blood pressure.

Hypothalamus-releasing factors (HRFs): hormones produced by the hypothalamus that regulate the secretion of hormones in turn produced by the anterior pituitary gland.

Identity: a composite of how people view themselves in the biological, psychological, and social domains of life.

Identity accommodation: the process of making changes in identity in response to experiences that challenge people's current view of themselves.

Identity achievement versus identity diffusion: stage in Erikson's theory when individuals must decide "who" they are and what they wish to get out of life.

Identity assimilation: process involving the interpretation of new experiences in terms of a person's existing identity.

Identity balance: process involving the dynamic equilibrium that occurs when people tend to view themselves consistently but can make changes when called for by their experiences.

Identity process theory: proposal that identity continues to change in adulthood in a dynamic manner.

Identity status interview: examines the degree of commitment held by the individual to identity issues and the degree of exploration the individual used to arrive at this commitment.

Immigrant population: persons who are, or who have ever been, landed immigrants or permanent residents. Persons who are Canadian citizens by naturalization are also immigrants.

Immune senescence: the belief that there are widespread age-related declines in immune system functioning.

Implicit memory: long-term memory for information that people acquire without intending to do so.

Incidence statistics: data that provide estimates of the percent of people who *first* develop symptoms in a given period.

Independent variable: the factor that the researcher manipulates.

Individuality: a principle of adult development and aging that asserts that as people age, they become more different from each other.

Industry versus inferiority: stage in Erikson's theory that involves the individual's identifying with the world of work and developing a work ethic.

Informed consent: written agreement to participate in research based on knowing what participation will involve.

Inhibitory control: the process of turning off one response while performing another.

Inhibitory deficit hypothesis: proposal that aging reduces the individual's ability to inhibit or tune out irrelevant information.

Initiative versus guilt: stage in Erikson's theory when the child becomes able to engage in creative self-expression without fear of making a mistake.

Inoculation hypothesis: the belief that older minorities and women have actually become immune to the effects of ageism through years of exposure to discrimination and stereotyping.

Institutional facility: a group residential setting that provides individuals with medical or psychiatric care.

Instrumental activities of daily living (IADL): the ability to use the telephone, go shopping, prepare meals, complete housekeeping tasks, do laundry, use private or public transportation, take medications, and handle finances.

Intelligence: an individual's mental ability.

Intelligence test: assessment of an individual's overall cognitive status along a set of standardized dimensions.

Interactionist model: the view that not only do genetics and environment interact in complex ways to produce their effects on the individual but also that individuals actively shape their own development.

Intergenerational solidarity model (ISM): summarizes the six relevant dimensions of families that span at least two generations.

Intergenerational stake hypothesis: proposal that parents are higher in affectual solidarity towards their children than children are towards their parents.

Inter-individual differences: differences between people.

International Statistical Classification of Diseases and Related Health Problems (ICD): the reference guide to all medical illnesses, including psychological disorders.

Interpersonal therapy (IPT): an approach that helps clients learn to understand and change their relationships with others.

Intersectionality: the notion that multiple "isms" such as ageism, sexism, and racism do not just add up, but interact with one another to influence the discriminatory ways in which people reflecting more than one group are treated.

Intimacy versus isolation: stage in Erikson's theory when individuals are faced with making commitments to close relationships.

Intra-individual differences: variations within the same individual.

Intrinsic factors in vocational satisfaction: the tasks required to perform the work itself.

Invisible death: the current Western attitude of a desire for death to retreat from the family and to be confined to hospitals.

Job tenure: the length of time a person has spent in the job.

Korsakoff syndrome: a form of neurocognitive disorder progressing from Wernicke's disease to a chronic form of alcohol-induced neurocognitive disorder.

Labour force: includes all civilians in the over-16 population who live outside of institutions and have sought or are actively seeking employment.

Laboratory studies: the testing of participants in a systematic fashion using standardized procedures.

Labour force: the percentage of the population, 15 years and older, who did any work at all or had a job but did not work due to illness or disability, personal or family responsibilities, vacation, or labour dispute.

Lastingness: the quality of an older artist's work that allows it to persist over time.

Latent variable: a statistical composite of several variables.

Late-onset Alzheimer's disease: a form of Alzheimer's disease that starts after the age of 60 or 65 years.

Late-onset schizophrenia: a form of schizophrenia originating in adults over the age of 45 years.

Late-onset stress symptomatology (LOSS): a phenomenon observed in aging veterans who were exposed to stressful combat situations in young adulthood.

Legitimization of biography: steps to leave a legacy that will continue to define oneself after one is gone.

Life course perspective: the norms, roles, and attitudes about age that have an impact on the shape of each person's life.

Life course perspective on retirement: proposal that changes in the work role in later life are best seen as logical outgrowths of earlier life events.

Life expectancy: the average number of years of life remaining to people born within a similar period of time.

Life satisfaction: the overall assessment of an individual's feelings and attitudes about one's life at a particular point in time.

Life span: the maximum length of life for a given species.

Life-span perspective: the view of development as continuous from childhood through old age.

Life story: the individual's narrative view of his or her own past.

Life structure: the way that the individual's life is patterned at a given point in time.

Living apart together (LAT): living arrangement increasingly adopted by unmarried older adults in an intimate relationship who do not wish to share a residence.

Logistic regression: a method in which researchers test the likelihood of an individual receiving a score on a discrete yes–no variable.

Longitudinal design: a research design in which people are followed repeatedly from one test occasion to another.

Long-term memory: the repository of information that is held for a period of time ranging from several minutes to a lifetime.

Low-density lipoproteins (LDLs): known as "bad" cholesterol, the transport mechanisms that send cholesterol to the arteries.

Lung age: a mathematical function showing how old your lung is based on a combination of your age and a measure obtained from a spirometer called forced expiratory volume.

Macrosystem: from the ecological perspective, includes the larger social institutions ranging from a country's economy to its laws and social norms.

Magnetic resonance imaging (MRI): a brain imaging method that uses radio waves to construct a picture of the living brain based on the water content of various tissues.

Major depressive disorder: disorder in which the major symptom is an extremely sad mood that lasts most of the time for at least 2 weeks and is atypical of the individual's usual mood.

Marriage: a legally sanctioned union between two adults.

Maturation hypothesis: the belief that people who have personality disorders that involve "immature" symptoms, such as acting out, being entitled, and having an unstable sense of self, improve or at least become more treatable later in life.

Mechanics of intelligence: involves cognitive operations such as speed, working memory, and fluid intelligence.

Mechanistic model: proposal that people's behaviour changes gradually over time, shaped by the outside forces that cause them to adapt to their environments.

Mediation: a method used to compare the correlation between two variables with and without their joint correlation to a third variable.

Medical assistance in dying (MAiD): the practice whereby a physician or a nurse practitioner administers a drug that intentionally causes death or prescribes a drug that persons can take themselves to end their lives.

Medical model: a perspective that focuses primarily on the physiological causes of a psychological disorder.

Melatonin: the hormone manufactured by the pineal gland responsible in part for the sleep–wake cycles.

Memantine: a type of medication for Alzheimer's disease that targets the excitatory neurotransmitter glutamate.

Memory controllability: beliefs about the effects of the aging process on memory, such as the extent to which the individual believes that memory decline is inevitable with age.

Memory self-efficacy: the degree to which an individual believes he/she can successfully complete a memory task.

Menopause: the point in a woman's life when menstruation stops permanently.

Mental status examination: assessment of qualities of the client including appearance, attitudes, behaviour, mood and affect, speech, thought processes, content of thought, perception, cognition, insight, and judgment.

Mesosystem: from the ecological perspective, the system in which interactions take place among two or more microsystems.

Meta-analysis: a statistical procedure that allows for a combination of findings from independently conducted studies.

Metabolic syndrome: a cluster of symptoms associated with high-risk factors for cardiovascular (and other) diseases, including high levels of abdominal obesity, high blood fats, abnormal levels of blood cholesterol, hypertension, and high glucose.

Microsystem: from the ecological perspective, the setting in which people have their daily interactions and that therefore have the most direct impact on their lives.

Midlife crisis: a period of self-scrutiny and re-evaluation of goals triggered by the individual's entry into middle age.

Mild cognitive impairment (MCI): a form of neurocognitive disorder that signifies that the individual may be at risk for developing Alzheimer's disease.

Millennials: the generation reaching young adulthood in the early 21st century.

Mini-Mental State Examination (MMSE): a brief, structured tool that clinicians use as a screening device to assess dementia.

Moderation: condition in which two variables are believed to have a joint influence on a third.

Modernization hypothesis: proposal that the increasing urbanization and industrialization of Western society is what causes older adults to be devalued.

Montreal Cognitive Assessment (MoCA): A brief, structured screening tool that is more sensitive than the MMSE in differentiating mild cognitive impairment from normal cognition.

Most Efficient Design: a set of three designs manipulating the variables of age, cohort, and time of measurement.

Motivation crowding out: describes workers who feel that they cannot fulfill their intrinsic needs because their motivation is controlled entirely by extrinsic factors.

Multidirectionality: the idea that development can proceed in multiple directions within the same person.

Multi-infarct dementia or MID: the most common form of vascular neurocognitive disorder; caused by transient ischemic attacks.

Multiple jeopardy hypothesis: proposal that older individuals who fit more than one discriminated-against category are affected by biases against each of these categorizations.

Multiple regression analysis: form of correlational study in which one set of variables are designated as predictors of performance on another variable designated as the outcome.

Multiple threshold model: proposal that individuals realize that they are getting older through a stepwise process as aging-related changes occur.

Multivariate correlational design: a research design where researchers simultaneously evaluate the effects of more than two variables.

Mutations: alterations in genes that lead to changes in their functions.

Myocardial infarction: an acute condition in which the blood supply to part of the heart muscle (the myocardium) is severely reduced or blocked.

Need complementarity hypothesis: proposal that people seek and are more satisfied with marital partners who are the opposite of themselves.

NEO-PI-R: a questionnaire containing 240 items measuring the 30 facets of the Five-Factor model.

Nephrons: cells in the kidneys that serve as millions of tiny filters that cleanse the blood of metabolic waste.

Neurocognitive disorder with Lewy bodies: condition first identified in 1961; similar to Alzheimer's disease in that it causes progressive loss of memory, language, calculation, and reasoning as well as other higher mental functions.

Neurocognitive disorder: a condition in which an individual experiences a loss of cognitive function severe enough to interfere with normal daily activities and social relationships.

Neurofibrillary tangles: abnormally twisted fibres within the neurons that occurs in Alzheimer's disease.

Neuronal fallout model: proposal that individuals progressively lose brain tissue over the life span because neurons do not have the ability to replace themselves when they die.

Neuropsychological assessment: method of gathering information about a client's brain functioning from a series of standardized cognitive tests.

New modes of retirement: the view that the characteristics of the person's spouse and lifelong family responsibilities play a role in retirement decisions and adjustment.

Niche-picking: the proposal that genetic and environmental factors work together to influence the direction of a child's life.

Non-normative influences: the random idiosyncratic events that occur throughout life.

Normal aging is different from disease: the principle that growing older does not necessarily mean growing sicker.

Normal-pressure hydrocephalus: a reversible form of neurocognitive disorder that can cause cognitive impairment, dementia, urinary incontinence, and difficulty in walking.

Normative age-graded influences: influences that lead people to choose experiences that their culture and historical period attach to certain ages or points in the life span.

Normative history-graded influences: events that occur to everyone within a certain culture or geopolitical unit (regardless of age).

Nursing home: a type of medical institution that provides a room, meals, skilled nursing and rehabilitative care, medical services, and protective supervision.

O*NET, the Occupational Information Network: an interactive national database of occupations.

Observational method: a way for researchers to conduct a systematic examination of what people do in particular settings.

Obsessive-compulsive disorder: disorder characterized by unrelenting, irrational, and distracting obsessions, or repetitive thoughts and compulsions, or repetitive behaviours.

Obsessive-compulsive personality disorder: personality disorder with symptoms that include excessive rigidity, preoccupation with details and rules, excessive perfectionism, and over-conscientiousness.

Occupational reinforcement patterns (ORPs): the work values and needs likely to be reinforced or satisfied by a particular occupation.

Old Age Security: a taxable monthly payment from the government available to most Canadians 65 years and older.

Old age style: a special quality common to the work of older artists and writers.

Oldest-old: a subgroup of older adults between the ages of 85 and older.

Old-old: a subgroup of older adults between the ages of 75 and 84.

Optimal aging: growing older in a way that slows or alters the process.

Organismic model: proposal that heredity drives the course of development throughout life.

Orientation: reflects whether examinees know where they are (orientation to place), what time it is (orientation to time), and who they are (orientation to person).

Osteoarthritis: a painful, degenerative joint disease that often involves the hips, knees, neck, lower back, or the small joints of the hands.

Osteoporosis: a disease that occurs when the bone mineral density reaches the point that is more than 2.5 standard deviations below the mean of young, White, non-Hispanic women.

Overactive bladder: a condition whose symptoms include incontinence and the need to urinate more frequently than normal.

Overtreatment: occurs when patients do not have their DNRs respected but instead receive active life support that includes resuscitation.

Panic disorder: disorder that involves the experience of panic attacks in which people have the physical sensation that they are about to die.

Paradox of well-being: findings from research on successful aging that so many older adults maintain high subjective well-being despite facing challenges from their objective circumstances.

Parkinson's disease: a disease that shows a variety of motor disturbances, including tremors, speech impediments, slowing of movement, muscular rigidity, shuffling gait, and postural instability or the inability to maintain balance.

Path analysis: a method in which researchers test all possible correlations among a set of variables to see if they can be explained by a single model.

Perimenopause: a 3- to 5-year span in which a woman gradually loses her reproductive ability; it ends in menopause when a woman has not had her menstrual period for 1 year.

Peripheral ties: friendships that are not characterized by a high degree of closeness.

Personal aging: changes that occur within the individual and reflect the influence of time's passage on the body's structures and functions.

Personality disorder: a long-standing pattern of inner experience and behaviour that has maladaptive qualities.

Person–environment correspondence theory: proposal that people are most satisfied when their workplaces respond to their needs.

Photoaging: age-related changes in the skin due to radiation from the sun.

Pick's disease: a form of neurocognitive disorder that involves severe atrophy of the frontal and temporal lobes.

Pikes Peak Model of Geropsychology: a set of competencies that professional geropsychologists are expected to have when working with older adults.

Planck hypothesis: the tendency of peak scientific productivity to occur in early adulthood.

Plasticity in development: the course of development may be altered (is "plastic") depending on the nature of the individual's specific interactions in the environment.

Plasticity model: a view of the aging nervous system that proposal that although some neurons die, the remaining ones continue to develop.

Plaque: hard deposits inside the arterial walls consisting of cholesterol, cellular waste products, calcium, and fibrin.

Polypharmacy: a condition in which an individual takes multiple drugs.

Positive psychology: view intended to provide a greater understanding of the strengths and virtues that enable individuals and communities to thrive.

Positron emission tomography (PET) scan: a brain scan method that shows radioactive compounds in the blood as they pass through the brain.

Possible selves: model proposing that the individual's view of the self, or self-schema, guides the choice and pursuit of future endeavours.

Posterior-Anterior Shift with Aging (PASA) model: proposal that the front (anterior) of the brain in older adults becomes more responsive to make up for the lower responsiveness found in the rear (posterior) of the brain.

Postformal operations: a stage proposed by adult development researchers that refers to the way that adults structure their thinking over and beyond that of adolescents.

Post-traumatic stress disorder (PTSD): the diagnosis given to people whose symptoms persist for more than a month after a trauma and include the intrusion of distressing reminders of an event; dissociative symptoms, such as feeling numb or detached from others; avoidance of situations that might serve as reminders of the event; and hyperarousal, including sleep disturbances or irritability.

Pragmatics of intelligence: an individual's aptitude to apply his or her abilities to the solution of real-life problems.

Presbycusis: an age-related hearing loss due to degenerative changes in the cochlea or auditory nerve leading from the cochlea to the brain.

Presbyopia: the loss of the ability to focus vision on near objects.

Presenilin genes (PS1 and PS2): genes that may lead APP to increase its production of beta-amyloid, which in turn causes neurofibrillary tangles and amyloid plaques.

Prevalence statistics: data that provide estimates of the percentage of people who have ever had symptoms in a particular period.

Primary aging or normal aging: a set of changes built into the hard wiring of an organism that progress at different rates among individuals but are universal, intrinsic, and progressive.

Primary Mental Abilities Test (PMAT): assesses the seven abilities of Verbal Meaning, Word Fluency, Number, Spatial Relations, Memory, Perceptual Speed, and General Reasoning.

Problem-focused coping: coping in which people attempt to reduce their stress by changing something about the situation.

Problem-solving therapy (PST): form of therapy for major depressive disorder in which clients are taught ways to identify and solve their actual life problems.

Procedural memory: the recall of the actions involved in particular tasks, such as sewing on a button, playing the piano, and riding a bike.

Processing speed: the brain's efficiency in processing information.

Professional geropsychology: the application of gerontology to the psychological treatment of older adults.

Programmed aging theories: proposal that aging and death are built into the hardwiring of all organisms and are therefore part of the genetic code.

Prospective memory: the recall of events to be performed in the future.

Prospective study: a variant of longitudinal design in which researchers sample from a population of interest before they develop a particular type of illness or experience a particular type of life event.

Protean career: a career in which individuals are both self-directed and driven internally by their own values.

Psychodynamic perspective: emphasizes the ways in which unconscious motives and impulses express themselves in people's personalities and behaviour.

Psychodynamic therapy: focuses on the client's underlying conflicts; however, these traditional models are changing, and therapists working from this framework may emphasize other issues, such as the client's attachment style.

Psychological age: the performance that an individual achieves on measures of such qualities as reaction time, memory, learning ability, and intelligence.

Psychological assessment: a procedure in which a clinician provides a formal evaluation of an individual's cognitive, personality, and psychosocial functioning.

Psychological disorders: include the range of behaviours and experiences that fall outside of social norms, create adaptational difficulty for the individual on a daily basis, and put the individual or others at risk of harm.

Psychopathy: a set of traits that include a lack of remorse and an impulsive lifestyle.

Psychosocial theory of development: the view proposed by Erikson that at certain points in life, a person's biological, psychological, and social changes come together to influence his or her personality.

Psychotherapeutic medications: medications intended to reduce an individual's psychological symptoms.

Qualitative method: method in which researchers use a flexible approach to understand the main themes in their data.

Quasi-experimental design: a research design where groups are compared on predetermined characteristics.

Quebec Pension Plan: a plan that is unique to Quebec but operates in a similar manner to the Canada Pension Plan. Quebec does not participate in the Canada Pension Plan**.**

Random error theories: proposal that aging reflects unplanned changes in an organism over time.

Reaction time: the basic measure of processing speed.

Reciprocity in development: principle that people both influence and are influenced by the events in their lives.

Recycling: the process through which workers change their main field of career activity part way into occupational life.

Reliability: a measure's consistency and whether it produces the same results each time it is used.

Religion: an individual's identification with an organized belief system.

Reminiscence bump: period of clear memories from the age of about 10 to 30 years.

Remote memory: the recall of information from the distant past in general.

Replicative senescence: the loss of the ability of cells to reproduce.

Reserve capacity: abilities that are there to be used but are currently untapped.

Resilience: the ability to recover from stress.

Resource model: theory that an individual's adjustment to retirement reflects his or her physical, cognitive, motivational, financial, social, and emotional resources; the more resources, the more favourable will be the individual's adjustment at any one point through the retirement transition.

Respite care: service that provides family caregivers with a break while allowing the older adult to receive needed support.

Retirement: the withdrawal of an individual in later life from the labour force.

Retrieval-induced forgetting: being unable to remember information that a person knew at one time in the past.

Reversible neurocognitive disorders: disorders due to the presence of a medical condition that affects but does not destroy brain tissue.

RIASEC model: the six basic types that characterize an individual's vocational interests.

Rivastigmine: a generic version of the drug Exelon.

Role reversal: the family situation in which adult children take over in the role as parent because the parents are unable to care for themselves.

Role theory of retirement: proposal that retirement has deleterious effects because the loss of the work role loosens the ties between the individual and society.

Rowe and Kahn definition of successful aging: the absence of disease, high cognitive and physical function, and engagement with life.

Sandwich generation: proposal that midlife caregivers are sandwiched between their aging parents and their teenaged children.

Sarcopenia: a progressive age-related loss of muscle mass with a consequent loss of strength.

Scaffolding theory: proposal that older adults are able to recruit alternate neural circuits as needed by task demands to make up for losses suffered elsewhere.

Schemas: the mental structures people use to understand the world.

Schizophrenia: a disorder in which individuals experience a distorted perception of reality and impairment in thinking, behaviour, affect, and motivation.

Secondary aging or impaired aging: changes due to disease.

Secretases: in healthy aging, the part of APP remaining outside the neuron is trimmed by enzymes.

Secure attachment style: attachment style in which individuals feel able to rely on other people.

Selective attrition: the observation that the people who drop out of a longitudinal study are not necessarily representative of the sample that was originally tested.

Selective optimization with compensation model (SOC): proposal that adults attempt to preserve and maximize the abilities that are of central importance and put less effort into maintaining those that are not.

Self-determination theory: theory that focuses on the amount of control that workers have over their jobs as influences on vocational satisfaction.

Self-Directed Search (SDS): a self-administered questionnaire that allows one to assess where one fits on the RIASEC dimensions.

Self-efficacy: a term used in the social psychological literature to refer to a person's feelings of competence at a particular task.

Semantic memory: the ability to recall word meanings and factual information.

Sequential design: data collection strategies consisting of different combinations of the variables of age, cohort, and time of measurement.

Set point perspective: the view that people's personalities influence their level of well-being throughout life.

Sex: an individual's inherited predisposition to develop the physiological characteristics typically associated with maleness or femaleness.

Similarity hypothesis: proposal that the similarity of personality and values predicts both initial interpersonal attraction and satisfaction within long-term relationships.

Simple reaction time tasks: tasks used to measure processing speed in which participants are instructed to make a response, such as pushing a key as soon as a target appears.

Simple visual search: search in which the target differs from the other stimuli by only one feature, such as shape, color, or size.

Single-nucleotide polymorphisms (SNPs): small genetic variations that can occur in a person's DNA sequence.

Single-photon emission computed tomography (SPECT): a brain scan method that detects radioactive compounds as they pass through the brain.

Skip generation family: a family living situation in which children live with their grandparents and not their parents.

Sleep apnea: a disorder in which the individual becomes temporarily unable to breathe while asleep.

Social age: calculated by evaluating where people are compared to the "typical" ages expected for people to be when they occupy certain positions in life.

Social aging: the effects of a person's exposure to a changing environment.

Social anxiety disorder: disorder in which the individual experiences extreme anxiety about being watched by other people.

Social clock: the expectations for the ages at which a society associates with major life events.

Social comparison: the process that occurs when people rate themselves relative to their primary reference group.

Social death: the process through which the dying become treated as non-persons by family or health care workers as they are left to spend their final months or years in a hospital or nursing home.

Social exchange theory: theory that predicts why some relationships succeed and others fail in terms of whether the relationship's rewards exceed its costs.

Social indicators: objective measures of social and economic welfare and an individual's level of psychological well-being.

Social indicator model of well-being: the view that demographic and social structural variables account for individual differences in levels of well-being.

Socioeconomic status (SES): or "social class," reflects people's position in the educational and occupational ranks of a society.

Socioemotional selectivity theory: proposal that throughout adulthood, people structure the nature and range of their relationships to maximize gains and minimize risks.

Somatopause of aging: a decline in the somatotropic axis (GH and IGF-1).

Source memory: the recall of where or how an individual acquires information.

Specific phobia: disorder in which the individual has having an irrational fear of a particular object or situation.

Stages of dying: the process considered to occur universally among terminally ill patients including denial, anger, bargaining, depression, and acceptance.

Stereotype threat: proposal that people perform in ways consistent with negative stereotypes of the group to which they see themselves as belonging.

Stress incontinence: a condition in which the individual is unable to retain urine while engaging in some form of physical exertion.

Stress: the perception that a situation overwhelms the individual's ability to manage effectively in that situation.

Strong Vocational Interest Inventory (SVII): consists of items in which respondents indicate their preferences for occupations, topics of study, activities, and types of people.

Structural ambivalence: the idea that society's structures do not make clear how family members should behave.

Structural equation modelling (SEM): a process where researchers test models involving relationships that include latent variables.

Subcutaneous: the bottommost layer of skin, giving the skin its opacity and smoothing the curves of the arms, legs, and face.

Subdural hematoma: a blood clot that creates pressure on brain tissue.

Subjective well-being: an individual's overall sense of happiness.

Successful cognitive aging: defined as cognitive performance that is above the average for an individual's age group as objectively measured.

Suffocation model of marriage: contemporary adults place more emphasis on marriage as a source of self-expression and fulfillment, but have less time to devote to maintaining their marriages than ever before.

Superagers: individuals 80 years and older with episodic memory that is comparable to, or superior than, that of middle-aged adults.

Super's life-span life-stage theory: focuses on the role of the self and proposal that people attempt to realize their inner potential through their career choices.

Supercentenarians: people who are 110 years old and older.

Survey method: a method to gain information about a sample that can then be generalized to a larger population.

Survivor principle: idea that people who live to old age outlive the many threats that could have caused their deaths at earlier ages.

Sustained attention: type of attention in which participants completing a task must respond when they see a particular target appear out of a continuous stream of stimuli.

Swan song: the last burst of creativity of an older musician.

Tamed death: the prevailing view until the Middle Ages in which death was viewed as familiar and simple, a transition to eternal life.

Tau: the protein that makes up neurofibrillary tangles.

Telomeres: repetitive DNA sequences at the ends of chromosomes.

Terminal decline: the gradual loss of cognitive abilities as an individual draws closer to death.

Terror management theory: proposal that people regard with panic and dread the thought of the finitude of their lives.

Tertiary aging: the rapid loss of functions experienced at the very end of life.

Testing the limits: the process of continuing to train people until they show no further improvements.

Tetrahydroaminoacridine (THA): medication also called tacrine and given the brand name Cognex.

Theory of multiple intelligences: theory that intelligence includes several traditional abilities as well as others not usually tapped in intelligence tests.

Time of measurement: the year or period in which a person is tested.

Time-sequential design: method in which data are organized by age and time of measurement.

Tinnitus: a symptom in which the individual perceives sounds in the head or ear (such as a ringing noise) when there is no external source.

Trait: a stable, enduring disposition that persists over time.

Trait perspective: a theory based on the assumption that the organization of the personal dispositions known as traits guides the individual's behaviour.

Transient ischemic attack (TIA): a condition caused by the development of clots in the cerebral arteries; also called a ministroke.

Transition to parenthood (TtP): the period of adjustment to the new family status represented by the presence of a child in the home.

Triglycerides: fats that are stored in the body's cells.

Two-factor motivational theory: proposal that intrinsic and extrinsic factors play different roles in contributing to vocational satisfaction.

Type A behaviour pattern: a collection of traits that include being highly competitive, being impatient, feeling a strong sense of time urgency, and being highly achievement-oriented.

Type D personality: people with high levels of anxiety, loneliness, and depression who try to suppress their feelings.

Urge incontinence: a form of urinary incontinence in which the individual experiences a sudden need to urinate and may even leak urine.

Useful field of view (UFOV): test of people's ability to respond to stimuli appearing in the periphery of their vision.

Validity: a test's ability to measure what it is supposed to measure.

Variable: a characteristic that "varies" from individual to individual.

Vascular neurocognitive disorder: a progressive loss of cognitive functioning due to damage to the arteries supplying the brain.

Vertigo: the sensation of spinning when the body is at rest.

Visual search tasks: tasks that require that the observer locate a specific target among a set of distractors.

Vocation: a person's choice of an occupation.

Vocational satisfaction: the extent to which people find their work to be enjoyable.

Wear and tear theory: proposal that as people age, they believe they are "falling apart."

Wechsler Adult Intelligence Scale (WAIS): the most well-known individual test of adult intelligence.

Wernicke's disease: an acute condition caused by chronic alcohol abuse involving delirium, eye movement disturbances, difficulties maintaining balance and movement, and deterioration of the nerves to the hands and feet.

White matter hyperintensities (WMH): abnormalities in the brain thought to be made up of parts of deteriorating neurons.

Whitehall II: a survey of a large sample of British adults focusing on the relationships among health, social class, and occupation.

Widowhood effect: the greater probability of death in those who have become widowed compared to those who are married.

Work–family conflict model: proposal that people have a fixed amount of time and energy to spend on their life roles.

Work–family enrichment model: proposal that experiences in one role improve the quality of life in the other.

Working memory: memory process that keeps information temporarily available and active in consciousness.

World Health Organization definition of active aging: the process of optimizing opportunities for health, participation, and security in order to enhance quality of life as people age.

Young-old: a subgroup of older adults between the ages of 65 and 74.

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